痛みの認知・表現・推測に関する認知科学的アプローチ

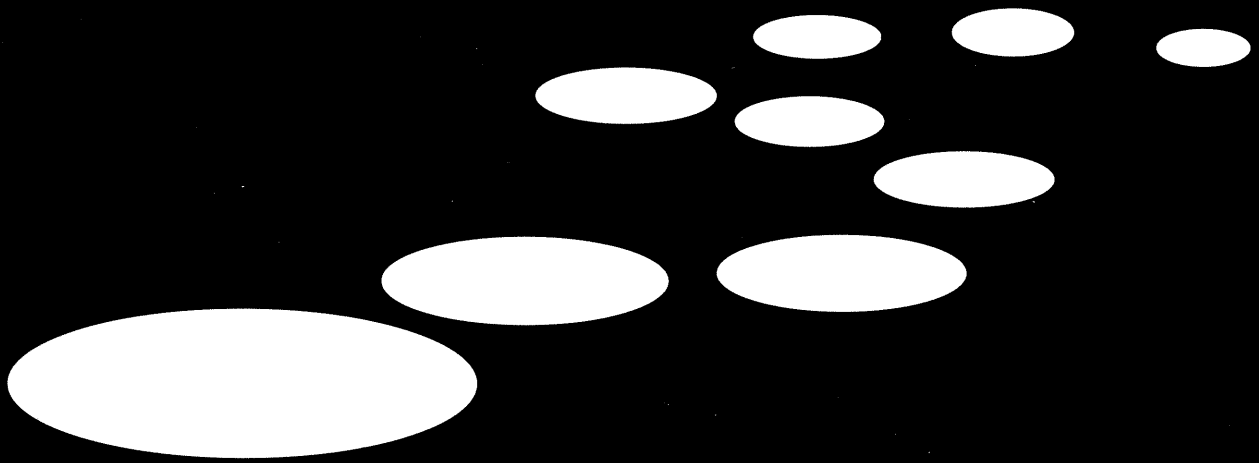
AUTHOR(S):

子安, 増生

痛みの認知・表現・推測に関する認知科学的アプローチ

課題番号：１５６５００４５

平成 15 年度～ 17 年度
科学研究費補助金（萌芽研究）
研究成果報告書



平成 18 年 3 月

研究代表者　子安増生
京都大学大学院教育学研究科・教授

痛みの認知・表現・推測に関する
認知科学的アプローチ

研究代表者　子安増生

目　　次

はしがき　・・・

はしがき

研究目的

痛み（pain）は、生から死に至るまでのあらゆる過程で関与するという意味で、人間にとって根源的なものである。痛みの問題は、精神物理学の感覚・知覚研究として古い歴史を持つ一方、医学の治療上の問題として現代的意義を有している。そのような基礎研究としての痛覚研究と応用研究としての痛み治療研究の間に位置するものとして、極めて主体的な感覚としての痛みをどのように認知し、表現し、それを他者がどのように推測するかという痛みの認知科学的研究を行うことは、これまでほとんど検討されていない。本研究は、痛みが純粋に医学的・身体的な体験でなく、社会的文脈の中で体験されるものであるという前提のもとに、痛みに対する認知・表現・推測に関する基礎的データを得て、主観的な感覚としての痛みが、メタファーとしてどのように最も効果的に――「正確に」ではない――表現されるかを示すと共に、演劇の熟達者（俳優）が痛みをどのように演劇的に表現するかを実験的に検討した。

研究組織

研究代表者　子安 増生（京都大学大学院教育学研究科・教授）
研究分担者　楠見　孝　（京都大学大学院教育学研究科・助教授）
研究協力者　中本 敬子（日本学術振興会特別研究員 PD；京都大学大学院教育学研究科）
研究協力者　安藤 花恵（日本学術振興会特別研究員；京都大学大学院教育学研究科博士課程）

交付決定額（配分額）

（金額単位：円）

	直接経費	間接経費	合　計
平成 15 年度	1,400,000	0	1,400,000
平成 16 年度	800,000	0	800,000
平成 17 年度	1,000,000	0	1,000,000
総　計	3,200,000	0	3,200,000

研究発表

(1) 学会誌等

楠見孝・中本敬子・子安増生　（投稿中）痛みの比喩表現の身体感覚と認知の構造.

Ando, H., & Koyasu, M. (Submitted) Differences between acting as if one is experiencing pain and acting as if one is pretending to have pain among actors at three expertise levels.

(2) 口頭発表

楠見孝・中本敬子・子安増生 2004　痛みの比喩表現を支える身体感覚と形容語・擬態語の構造. 第 21 回日本認知科学会大会発表論文集, 52-53.

安藤花恵・子安増生　2005　俳優の熟達度による痛みの演技の差異. 日本教育認知科学会第 22 回大会発表論文集, 22-23.

楠見孝・中本敬子・子安増生 2004 痛みの比喩表現を支える身体感覚と形容語・擬態語の構造. 第21回日本認知科学会大会発表論文集, 52-53.

痛みの比喩表現を支える身体感覚と形容語・擬態語の構造

楠見 孝・中本敬子・子安増生
(京都大学 大学院教育学研究科)

キーワード：身体的痛み，比喩，慣用表現，擬音語

痛みの言語表現は，(解釈,意味づけなどの)個人内伝達と個人間伝達を支えている．すなわち，痛みの言語表現，とくに比喩は，自他の痛みの認知過程を支える認知的モデル解明の手がかりとなる．

痛みの比喩表現，とくに，慣用表現には，文化や言語を越えた普遍性と特殊性がある．これは，人類に共通した生理・感覚運動的経験に基づく身体化(embodiment)と，認知・文化的プロセスにより支えられていると考える．従来，感情を表現する比喩については，認知言語学的に検討されてきた(e.g., Kovecses, 2002; 楠見, 1986; Lakoff, 1987)が，痛みの比喩の研究は少ない，また，痛みに関しては，感覚心理学(e.g.,丸田,1989; 東山ほか, 2000)や医学・看護学(e.g., Melzak,1975; 尾山,1990)，医療人類学(e.g., Morris,1998)の分野で研究されてきたが，その認知的・言語的基盤に関する検討は十分では無い．

そこで，本研究では，身体的痛みに関する言語表現，とくに比喩的な形容語と擬態語について，身体部位，知覚的特性，認知的評価の水準の対応関係を明らかにする．そして痛みの比喩表現を支える身体感覚的，認知的，言語的基盤を検討する．

方 法

【被験者】 首都圏近郊の大学生・短大生432(男性228, 女性204)名．平均年齢20.3 (SD 2.5)歳．

【言語材料の収集】 下記のような手順で身体的痛みを表現する慣用比喩および擬音・擬態語を収集した．(1)痛み研究（東山ら 2000; Hasegawa, et al., 2001）の内，主として痛み質問票に使用されている語句を収集した．(2) 苧阪(1999)の擬音・擬態語研究，および擬音語・擬態語辞典(山口,2003 ほか)から「痛み・触覚」を表すとされる擬音・擬態語を収集した．また，他の感覚等を表す語であっても第1, 第2著者の合議により痛みを表現するために使用される可能性があると判断した語は調査対象として選択した．(3)上記以外の比喩的形容語をWEB上の掲示板や日記から収集した．これらの手続きで収集した表現から，網羅範囲と頻度の2つを考慮して，形容的語句58ケース，擬音・擬態40ケース，計98ケースを材料に用いた．

【評定項目と冊子の構成】 評定は，質問紙により，講義中に集団で実施した．質問紙は，各頁の上部に痛み表現（たとえば，うずうずする痛み）を挙げ，以下の4つに評定項目群が続いた．

(1) 痛みを感じる部位： 痛み表現が身体のどの部位で生じるかを16の身体部位（頭, 歯, 胃, 肩, 手腕, 皮膚等）から選択させた（複数回答可）．

(2) 痛みの身体感覚的特徴：痛み表現の持続時間, 時間間隔(低頻度-絶え間ない), 場所の変化(静止-移動), 深さ，面積，体積，強さの7項目(Satow et al.,1988; 1990)について5件法評定を求めた．

(3) 痛みの認知的評価（主観的イメージ）：痛み表現に対して，どんなイメージが浮かぶかを SD法尺度 7 項目（鋭い-鈍い，熱い-冷たい，圧迫感が強い-弱い等)について5段階で評定させた．

(4) 痛みの経験頻度： 痛み表現を実際にどれくらい経験したことがあるかを 5 件法（1.全くない－5.とても頻繁に）で評定させた．

被験者の負担を軽減するため，98個の痛み表現を4つのサブセットに分割し，異なる被験者に割り当てた．また，各サブセットに2種類の異なるランダム順序の冊子を作成した．

結果と考察

【各評定における痛み表現の構造】

(1) 痛みの身体部位:痛み表現の構造を明らかにするために16の身体部位に痛みが生じると回答した被験者数を変数として主成分分析(PCA)を行ったところ，第3主成分までの寄与率は23.9, 16.8, 15.3（累積56.2）%であった．身体部位の第1,2主成分負荷量と各痛み表現の主成分得点を図 1a に示す．PC1は四肢・関節-内蔵器官を両極に持つ成分であり， PC2は頭部-腰肩の成分，PC3は頭歯-目喉の成分と考えられる．あわせてクラスタ分析（ユークリッド距離；Ward法）を行い，7クラスタの水準で解釈した(図1の記号は所属クラスタを示す)．

(2) 身体感覚的特徴： 身体感覚的特徴の平均評定値7項目を変数として，(1)と同様にPCAをおこなった結果，第1,2主成分の寄与率は50.5, 20.8（累積71.2）%であった．図1bに示すPC1は痛みの大

きさや全般的な強さを，PC2 は激しさや鋭さを表すと考えられる．さらにクラスタ分析を行い，9 クラスタ水準で解釈した．

(3) 痛みの認知的評価：認知的評価の平均評定値 7 項目を変数として，PCA をおこなった結果，第 1,2 主成分の寄与率は，48.8, 30.2（累積 79.1）%であった．図 1c に示す PC1 は痛みの強さ・重さに，PC2 は痛みの鋭さを表していると考えられる．クラスタ分析を行い，9 クラスタ水準で解釈した．

【認知的評価，身体感覚特徴，身体部位の関係】

3 つの水準間の痛み表現構造の対応を検討するため，98 の痛み表現に対する主成分得点を変数とし，相関係数を算出した（表 1 下三角行列）．身体部位の PC1(内蔵)と PC2(頭部)は身体感覚および認知的評価の PC1(強度)と有意な相関があり対応が見られた．さらに，各評定の主成分得点を変数群とした正準相関分析を行った結果，1 次，2 次の正準相関係数は，認知的評価と身体感覚の間は非常に高いが，認知的評価と身体部位，身体感覚と身体部位との間は中程度であった．さらに，認知的評価の 2 変数と身体感覚・身体部位をあわせた変数群との間は.939,.609 と高かった．痛み表現の認知的評価構造はその基盤にある身体感覚と身体部位に基づく構造との対応関係が示された．

総合的考察：概念メタファ

痛み表現のクラスタ分析の結果は，痛みの強-弱で二分される構造が，第 1 主成分(PC1)と対応する形で，3 つの水準において共通して見られた．

強い痛みクラスタには，直喩表現がやや多い．腹部の深く長い痛みを表現する「押しつぶされるような」「ねじ込まれるような」「ぐいぐいする」など身体容器メタファに対する鈍器メタファ群と「突き刺すような」「きりきりする」「切り刻まれるような」など鋭い痛みを表す凶器メタファ群があり，皮膚・のどの持続的痛みには「焼けるような」「かーとする」などの燃焼メタファ群があった．

一方，弱い痛みクラスタには，擬態語表現が多い．持続する痛みを表現する身体容器内にある異物メタファ群（例：ぐりぐりする，じんじんする），歯痛のように瞬間的な痛みには，外的な刺激物メタファとしての氷メタファ群（例：ひやりとする）や電気メタファ群（例：電気が走るような），皮膚の浅い小さい痛みでは，針メタファ群（例：針で突かれたような，ちくりとする）があった．

[付記]本研究は平成 15 年度文部科学省科研費補助金・萌芽研究(研究代表者・子安増生)の助成を得た．

表 1　相関係数(下三角)と正準相関係数(上三角)

		身体部位			身体感覚		認知的評価	
		PC 1	PC 2	PC 3	PC 1	PC 2	PC1	PC2
身体部位	PC 2	.000	—		.557**		.599**	
	PC 3	.000	.000	—	.215		.236	
身体感覚	PC 1	.368*	.215*	-.160	—		.928**	
	PC 2	.227*	.022	.313**	.000	—	.587**	
認知的評価	PC1	.446**	.287**	.277**	-.791**	485**	—	
	PC2	.132	.047	.193	.321**	493**	.000	—

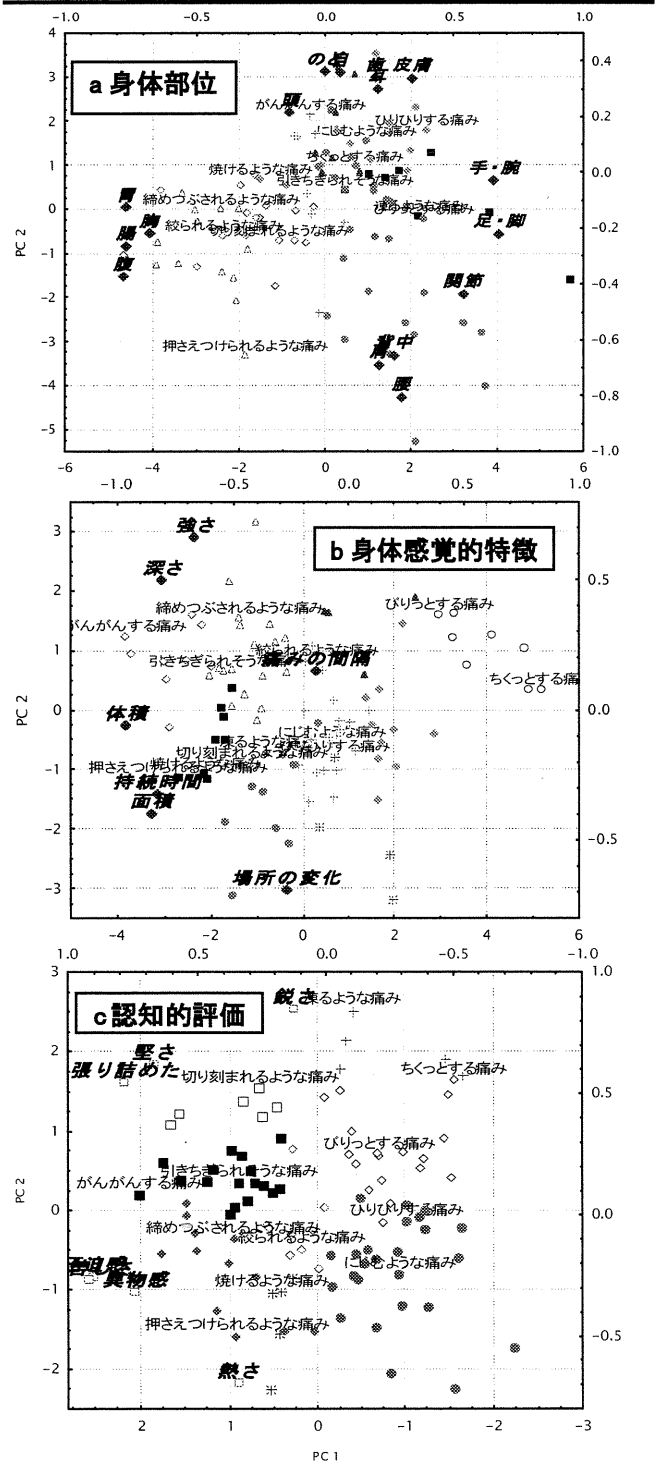


図 1　各評定項目群の主成分負荷量と表現の得点

安藤花恵・子安増生　2005　俳優の熟達度による痛みの演技の差異．日本教育認知科学会第22回大会発表論文集，22-23.

俳優の熟達度による痛みの演技の差異

安藤　花恵[1),2)]　・　子安　増生[1)]
([1)]京都大学大学院教育学研究科，[2)]日本学術振興会特別研究員)

痛みというのは非常に主観的な感覚であり，痛みの程度や質などを正確に他人に伝えることは難しい．また言語報告では簡単に嘘をつくことができ，これらのことは医療の現場で大きな問題となりうる．そこで他人の痛みの程度を測る際，言語情報よりも非言語情報をより重視することとなる（e.g. Poole & Craig, 1992）．よって相手に非言語情報（表情や声など）が伝わる状況では，痛みの演技をすることは難しいと言える．しかし演技の経験を積んでいる俳優は，痛みの演技も素人よりうまくできるだろう．そこで本研究では，演技経験を積むにつれ，難しいとされる痛みの演技がどのように変化するのか比較することとした．

材料の撮影

演技者　初心者（経験1年以下），中間（経験1年～5年），準熟達者（経験5年以上）の3群の俳優各12名ずつ（男女6名），計36名．

脚　本　あなたが演じる役は昨日，腹痛がひどく，一日休んでいました．今日は休日で，以前から妹と映画を見に行く約束をしていました．朝起きると，妹が「まだお腹痛い？」と尋ねます．

上記のような基本設定のもと，以下の4種類の場面を用意した．本当に痛くないので「痛くないよ」と言う（痛くない）．本当に痛いので「痛いよ」と言う（痛い）．痛くないのに痛いふりをして「痛いよ」と言う（痛いふり）．痛いのに痛くないふりをして「痛くないよ」と言う（痛くないふり）．

手　続　すべての演技者に，4種類の場面すべてを演じてもらった（場面の順序はカウンターバランス）．その際，ビデオカメラを妹と考えてビデオカメラに向かって演じるよう教示し，演技者の胸から上がフレーム内におさまるよう撮影した．

評定実験1

方　法

評定者　一般大学生および大学院生46名（男性20名，女性26名）．

材　料　36名の演技者×4場面，計144映像．

手　続　2名から15名の小集団で実施した．スクリーンに材料を映し，それぞれの映像について，(1) 4つの場面のうちどの場面を演じているものだと思うか（選択法），(2) この (1) の判断にどの程度確信があるか（7件法），(3) 演技がどの程度自然か（7件法），を評定してもらった．

結　果

場面の選択　評定(1)の結果をFigure 1に示す．

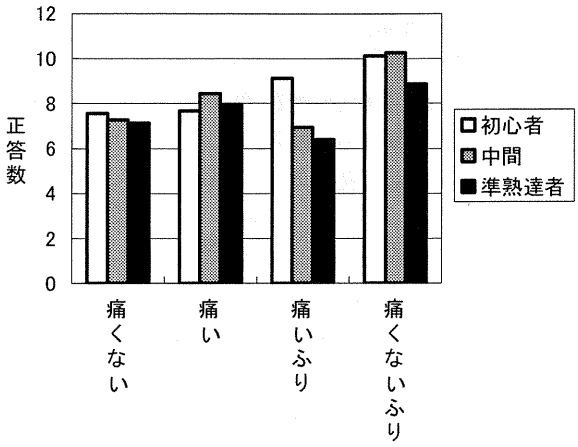


Figure 1.　場面選択の結果

演技者の熟達度×場面の分散分析をおこなった結果，痛いふり場面で初心者＞中間≒準熟達者，痛くないふり場面で初心者≒中間＞準熟達者であることが示された．つまり「ふりをする」という2場面において，経験の短い群の演技の方が，準熟達者群の演技よりも見る側に伝わりやすかったと言える．

確信度　評定（2）の結果について，演技者の熟達度×場面の分散分析をおこなった結果，痛いふり場面で初心者＞中間＞準熟達者であることが示された．

演技の自然さ　評定（3）の結果をFigure 2に示す．演技者の熟達度×場面の分散分析の結果、

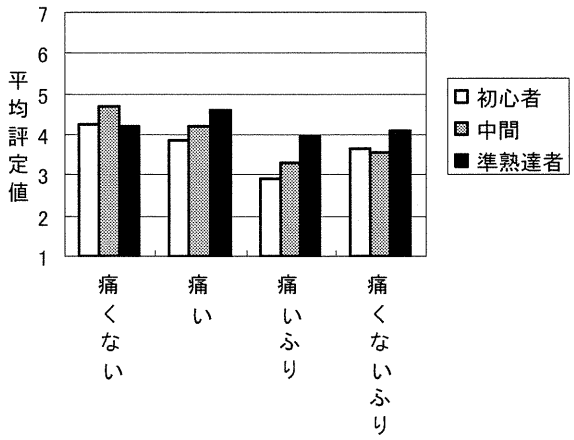


Figure 2.　確信度の結果

痛い場面と痛いふり場面で準熟達者＞中間＞初心者，痛くないふり場面で準熟達者＞中間≒初心者であることが示された．

考　察

痛いふりおよび痛くないふりという，「“演技をしている”という演技をする」，より複雑な場面において，経験が長くなるにつれ演技が自然になり，初心者の演技は不自然であることが示された．そして，自然な演技は伝わりにくいことも示された．経験が短い群はオーバーな演技をし，その結果どの場面を表そうとしているのかという意図があからさまになり，確信を持ってどの場面を演技しているかが判断されると考えられる．

演技撮影中，ビデオカメラは「観客」の役割と「妹(相手役)」の役割の両方を果たしていたため，観客に「ふりをしている」ことがあからさまにわかる演技では，妹にもふりが見破られてしまうと考えられる．準熟達者はこのバランスをとっていたのではないかと考え，次の実験をおこなった．

評定実験2

方　法

評定者　一般大学生および大学院生 38 名（男性 17 名，女性 21 名）．

材　料　全演技者の痛いふり場面および痛くないふり場面の映像，計 72 映像．

手　続　評定実験 1 で見られた評定時間の個人差に配慮し，個別に実施した．パソコン上に映像を映し，それぞれの映像について，(a) ふりをしていることがどの程度妹に見破られなさそうか，(b) ふりをしていることがどの程度観客に伝わるか，(c) 演技がどの程度自然か，(d) 演技がどの程度うまいか，を評定してもらった（7 件法）．

結　果

妹への見破られにくさ　評定（a）の結果を Figure 3 に示す．演技者の熟達度×場面の分散分析をおこなった結果，痛いふり場面で準熟達者＞中間＞初心者，痛くないふり場面で準熟達者＞中間＞初心者，痛くないふり場面で準熟達者＞中間≒初心者の順で，ふりをしていることが妹に見破られにくいことが示された．

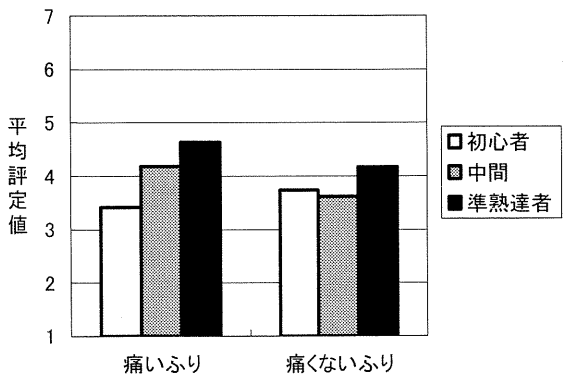


Figure 3.　妹への見破られにくさの結果

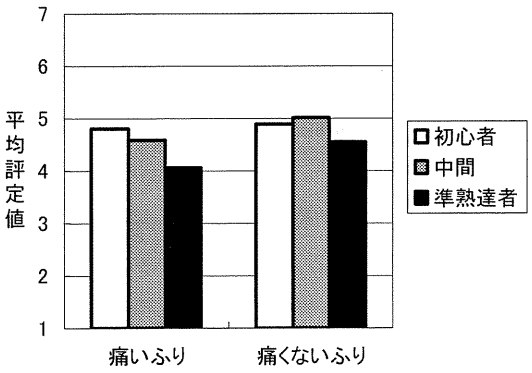


Figure 4.　観客への伝わりやすさの結果

観客への伝わりやすさ　評定（b）の結果を Figure 4 に示す．演技者の熟達度×場面の分散分析をおこなった結果，痛いふり場面で初心者＞中間＞準熟達者，痛くないふり場面で初心者≒中間＞初心者の順で，ふりをしていることが観客に伝わりやすいことが示された．

演技の自然さ　評定 (c) の演技の自然さについて同様に分散分析をおこなった結果，評定 (a) の結果と同じく，痛いふり場面で準熟達者＞中間＞初心者，痛くないふり場面で準熟達者＞中間≒初心者の順で，演技が自然であることが示された．

演技のうまさ　評定 (d) の演技のうまさについても，分散分析の結果，同じく痛いふり場面で準熟達者＞中間＞初心者，痛くないふり場面で準熟達者＞中間≒初心者であった．また，初心者のみ，痛いふり場面よりも痛くないふり場面の方がうまいと評定されたことも示された．

考　察

初心者のみ痛いふり場面よりも痛くないふり場面の方がうまいと評定されたことから，初心者にとって痛くないふり場面の方が簡単であり，すべての項目で初心者のパフォーマンスが上がっていた（中間群と変わらなかった）と言える．

ふりをしているということが観客に伝わりやすい演技は，すなわちだまさなければならない相手である妹にも，ふりをしていることが見破られやすいことになる．初心者は観客の目を意識するあまり，見る者に意図があからさまな演技をし，それは不自然で状況に沿わない（妹をだまそうとしているように見えない）ものとなる．経験が長くなるにつれ，観客を意識しつつも，状況に即した（妹にふりをしていることが見破られにくい），自然な演技ができるようになると考えられる．

痛みの比喩表現の身体感覚と認知の構造

Perceptual and cognitive characteristics of metaphorical pain language

楠見 孝・中本敬子・子安増生

京都大学

本研究は，痛みの言語表現，その中でも特に擬音語・擬態語および比喩的表現を支える身体的・認知的要因と言語的要因について，計量的データに基づいて，認知心理学的，認知言語学的観点から検討をおこなう。

痛みは，熱いものや尖ったものなどが身体に触れた際に起こる場合のように重大な傷害から逃れる危険信号を発したり，関節の損傷時のように痛みによって身体を不活動状態にし，生体に休息をとらせたりする働きを持つと言われる（東山・宮岡・谷口・佐藤, 2000）。また，痛みは医療を施す際に重要な診断基準となる徴候であり，痛みの種類による分類やその発生機構に関するモデル化が行われている。痛みの研究は主として，感覚心理学（たとえば，佐藤・奥富・谷口・宮岡・東山・畑山, 1991）や医学・看護学（たとえばSchreiner・ 守本・俵, 2002），医療人類学（e.g., Morris,1991, 渡邉・鈴木訳 1998）の分野で研究されてきたが，その認知的・言語的基盤に関する検討は十分ではない。

痛みは，個人の主観的経験であり，痛みの大きさや質を他者に直接に伝える手段はない。そのため，痛みの内容は，言語的な表現や表情，行動などを通して他者に伝達されることになる。とくに，医療や介護を受ける際に，痛みを正確に伝達するためには，言語表現の使用が必要不可欠である。そのため，医療現場では痛みの問診票が種々開発されているが，認知や言語の研究においても，人が，痛みをどのように認知し，言語表現するかを解明することは重要な心理学的テーマである。

痛みを他者に伝えるための言語表現には様々なものがある。頻繁に用いられる方法の一つが，その痛みが生じるに至った状況を説明することである。“落ちていた画鋲を思い切り踏んでしまい，とても痛かった”などの発話がこれに当たる。このような発話は，痛みの原因から結果である感覚内容を想起させる一種の換喩と見なせる。換喩は主要な比喩の１つである[3]。

しかし，痛みはこのように客観的な状況描写によってのみ言語的に伝達されるわけではない。むしろ，痛みを表すために様々な慣用的な比喩表現が存在しており，痛みの主観的な経験を伝達する役割を果たしている（e.g., Jairath, 1999; Soderberg & Norberg, 1994）。たとえば，“刺すような”，“締めつけられるような”などの痛み表現は，比喩であることを示す指標“のような”を含み，実際に針で刺されたり，工具で締めつけられたりはしていないため，直喩表現の一種と言える。さらに，日本語では痛み感覚を表現するために擬態語も頻繁に用いられる。たとえば，

連打されるように激しく痛む様子を表す“がんがん”や針で刺したような痛みを表す“ちくっ”といった表現がそれに当たる（たとえば山口, 2003）。これらの表現は，鈍器による打撃や針状のモノによる刺激といった痛みの原因と関連する表現と見なすことができ，慣用的な比喩表現と深く関わる。

また，痛みの比喩表現は，個人間の伝達のみならず，痛みや病気に対する解釈や意味づけやそれに伴う対処法の選択などにも影響を与えていると考えられる（Jairath, 1999）。たとえば，Gibbs & Franks（2002）は，がん患者へのインタビューから，比喩ががん経験の意味づけに影響していることを明らかにした。つまり，痛みの言語表現，とくに比喩は，自他の痛み認知を支える病気に関する素朴理論（folk theory）解明の手がかりともなる。

このような問題を考えると，痛みの言語表現の特性を明らかにすることは，重要な研究課題と言える。しかし，慣用的な痛み表現を全般的網羅的に検討した研究は多いとはいえない。特に，比喩の認知心理学的・認知言語学的研究が，比喩と感情の関係を解明してきたこと（たとえば，楠見, 1986; Lakoff, 1987）に比べると，痛みの慣用表現の研究は不足している。

これまでに行われてきた痛みと言語に関する研究の多くは，痛みの問診票の作成を目的としている（たとえば，Satow, Nakatani, & Taniguchi, 1988; Satow, Nakatani, Taniguchi, & Higashiyama, 1990）ため，扱う言語表現の網羅範囲はあまり広くない。一方，山中（1987），山中・山崎（1989）は痛み刺激（冷水，輻射熱，電気刺激）を与え，それらの痛みを表現する語句を生成，選択させることによって言語表現の分析を行っている。しかし，取り上げられている語句の範囲はやはり広くはないこと，また実験室で与えられる痛みと実験室外で経験する臨床痛とは様々な点で性質が異なっていると考えられることから，痛み表現の性質を一般化するには限界がある。

言語表現に注目した研究の中では，自然言語処理の文脈で，竹内・宇津木（1988）が 15 個の痛み表現について調査を行い，“痛みの強さ”と“周期性”，および“けいれん性”で表現を特徴づけられることを示した。しかし，彼らの研究は，類似性評定に基づいた痛みの表現空間の構成が主であり，その身体部位や痛みの知覚的特徴との関連に関する認知心理学的な考察は十分ではない。

上記の背景をふまえ，本研究では，身体的痛みに関する言語表現，とくに比喩的形容語と擬態語について，身体部位，知覚的特性，認知的評価の対応関係を明らかにする。そして痛みの比喩表現を支える身体感覚的，認知的，言語的基盤を検討する。

方　法

調査参加者　首都圏近郊および東北地方の大学生・短大生 432（男 228, 女 204）名が調査に参加した。平均年齢 20.3 歳であった。これらの参加者を 4 分し，評定対象の異なる 4 種の冊子にランダムに割当てた。各冊子に割り当てられた人数はそれぞれ 122, 102, 114, 98 名であった。

言語材料の収集　3 つの方法で身体的痛みを表現する慣用比喩および擬音語・擬態語を収集した。

(a) 痛みに関する先行研究（Hasegawa, et al., 2001;東山他，2000; Melzack,1973）の内，主に痛み質問票に使用されている語句を収集した。(b) 苧阪（1999）の擬音語・擬態語研究，およ

び擬音語・擬態語辞典（山口,2003 ほか）から“痛み・触覚”を表すとされる擬音語・擬態語を収集した。また，他の感覚等を表す語であっても著者の合議により痛みを表現するために使用される可能性がある語は調査対象として選択した。(c) 上記以外の痛みに関する比喩的形容語をウェブ上の掲示板や日記から，“痛み”をキーワードにして検索ツールによって収集した。

このように調査範囲を広くとった理由は，“キヤキヤする”等の造語さえも痛みの言語的伝達に使用されうるという報告（佐藤・奥富・谷口・宮岡・東山・畑山， 1991）に基づく。もちろん，本研究では，このような造語を検討対象にはできないが，本来的には痛覚以外の感覚を表す擬態語やウェブ上の用例も含めることでかなり広い範囲の表現を扱うことができると考えた。

これらの手続きによって収集した表現から，網羅範囲と頻度を考慮して，形容的語句 58 例，擬音語・擬態語 40 例，計 98 例を材料に用いた（Figure 4 を参照のこと）。材料は，直喩や隠喩だけでなく，換喩と見られる表現を多数含む。たとえば，“刃物で刺されたような”，“ハンマーで殴られたような”は痛み感覚が生じる原因となる出来事を述べることで痛みのイメージを表現する言葉であり，時系列的な近接に基づく換喩と考えられる。

評定項目と冊子の構成　評定は，質問紙により，授業時間中に集団で実施した。質問紙は，各頁の上部に痛み表現（たとえば，“ずきんずきんする痛み”）を挙げ，以下の 4 つの評定項目群が続いた。

(a) 痛みを感じる部位：それぞれの表現で表される痛みが身体のどの部位で生じるかを 16 の身体部位（頭，歯，目，耳，のど，肩，背中，胸，腹，胃，腸，腰，手・腕，足・脚，関節，皮膚（身体の表面），その他）の中から選択させた（複数回答可）。また，“その他”を選択したときには，場所を具体的に記入するよう求めた。選択肢には，まず，シソーラス（NTT コミュニケーション科学研究所, 1997; 山口, 2003）の“痛み”の項に記載された語句（頭痛，足痛，脚痛，腹痛，胃痛，歯痛，耳痛，胸痛，腰痛，背痛）に対応する部位名を用意した。また，改田（2001）の日常的不調，日常的不快症状を表す項目から，上記と重複がなく，“痛み”に関連する項目（首が痛い，肩が痛い，皮膚が荒れる，目が痛い，手足が痛い，喉が痛い，下痢をする（“腸”への対応を想定））を選択肢に加えた。以上の手続きにより，痛みを感じる代表的な部位を用意し，これに“その他”とそれに伴う自由記述欄を加えることで網羅性を高めた。

(b) 痛みの身体感覚的特徴：Satow et al. （1988, 1990）の痛み問診票に準じ，痛み表現の持続時間（1.短い－5.長い），時間間隔（1.長い（断続的）－5.短い（連続的）），場所の変化（1.静止している－5.移動する），深さ（1.浅い－5.深い），面積（1.狭い－5.広い），体積（1.小さい－5.大きい），強さ（1.弱い－5.強い）の 7 項目について，それぞれ 5 件法での評定を求めた。

(c) 痛みの認知的評価（主観的イメージ）：痛み表現に対してどんなイメージが浮かぶかを SD 法尺度 7 項目（鋭い－鈍い，熱い－冷たい，圧迫感が強い－弱い，異物感が強い－弱い，軽い－重苦しい，緩んだ－張り詰めた，柔らかい－堅い）について，5 件法で評定させた。

(d) 痛みの経験頻度：その表現で表される痛みを実際にどれくらい経験したことがあるかを 5 件法（1.全くない，2.何回か，3.ときどき，4.しばしば，5.とても頻繁に）で評定させた。

参加者の負担を軽減するため，98 個の痛み表現を 4 つのサブセットに分割し，異なる参加者に割り当てた。サブセットの内，3 つは 24 個の表現で，残りの一つは 26 個の表現で構成された。各サブセットに対し，2 種類の異なるランダム順序の冊子を作成した。

結　果

痛みの身体感覚的特徴7項目および認知的評価7項目については，各痛み表現に対する参加者の評定を平均し，表現を変量とする分析を行った。

痛み表現に対する経験頻度

それぞれの痛みの経験頻度の評定値（1.全くない－5.とても頻繁に）に対する平均を求め，痛みの平均頻度の指標とした[4]。98個の表現の平均を求めたところ，2.13 （*SD* 0.24）であり，全体的に痛みの経験はそれほど高くはない。もっとも頻度の高い痛みは，“がんがんする痛み”であり，平均2.65 であった。続いて，ずきんずきん（2.65），じんとする（2.60），ちくりとする（2.55）の平均頻度が高かった。逆に，もっとも頻度の低い痛みは，引っ張られるような痛み（1.61）であり，のこぎりでひかれたような（1.66），切り刻まれるような（1.67），刃物で刺されたような（1.70）などがそれに続いて頻度が低い。

41の擬態語の平均頻度評定値は2.23 （*SD* 0.24），57の比喩表現の平均は2.05 （*SD* 0.22）であり，両表現の経験頻度には有意な差が認められた（t (96) =3.16, p< .001）。このことから，全体的に，擬態語で表される痛みの方が比喩で表されるような痛みよりは経験頻度が高い。

各評定における痛み表現の構造

痛みの身体部位　各部位で典型的と考えられる痛みについて概観を得るため，選択頻度が最大の痛み表現を各部位ごとに列挙する（括弧内は選択者の比率）。頭：がんがんする（98%），歯：しみるような（74%），目：ちかちかする（91%），耳：きーんとする（26%），のど：はれたような（43%），肩：凝ったような（65%），背中：突っ張るような（21%），胸：締めつけられるような（58%），腹：破裂するような（44%），胃：きりきりする（63%），腸：ねじこまれるような（25%），腰：凝ったような（27%），手・腕：しびれたような（62%），足・脚：しびれたような（76%），関節：きしむような（61%），皮膚（身体の表面）：ひりひりする（70%）。

“その他”は，全表現を通じて，選択者の比率は低く，平均して2.4%であった。10%を越える参加者が “その他”を選択した表現は“つんとした痛み”のみで（98名中37名;37.8%），全員が“鼻”に該当すると記述していた。これをはずれ値として除外すると，“その他”選択率は，平均して2.1%であった。ここから，予め用意した15個の身体部位項目で，本研究で対象とした痛み表現のほぼ全てに該当する部位を網羅できたと考える。

痛み表現とそれらが使用される身体部位との関係を明らかにするため，対応分析を行った。なお，“その他”は選択人数が少なかったため，分析から除外した。対応分析の結果，第1次元で23.5%（固有値.245），第2次元で19.4%（.205）の分散説明率が得られた。表現および部位を第1,2次元上でプロットした図をFigure 1に示す。

Figure 1の布置から，次元1は身体の内部（頭や胸・腹）と表面 （皮膚や手足）との対立を示す次元と解できる。前者には｛ずきんずきん，締めつけられる,...｝などが，後者には｛すれる，ひきつる，突っ張る,...｝などが対応している。次元2は身体の胴体部（胸・腹）と頭部（頭・目）との対立を示すと解釈できる。前者には，｛締めつけられる，切り刻まれる,...｝，後者には｛割れる，ずきんずきん,...｝などの表現が対応している。

身体感覚的特徴 身体感覚的特徴の 7 項目は，痛みの感覚次元を構成する要素に対応すると考えられる。そこで，これらの項目の合成変量として痛み感覚を構成する主要な成分を明らかにするため，主成分分析を行った。分析では，平均評定値を変数とした。その結果，第1主成分で負荷量が高かった項目は，体積（ .960），面積（ .851），持続時間（ .830），深さ（ .808），強さ（ .671）であり，“全般的な強さ”を表すと解釈した（括弧内は負荷量を示す）。第2主成分では，場所の変化（ .694），深さ（-.494），強さ（-.659）の負荷量が高く，場所が広範囲に変化する“皮膚表面での痛み”を表すと考えられる。また，第3主成分は，痛みの間隔（ .949）でのみ高い負荷量を示したため，“断続性”と解釈した。寄与率は，第1主成分 50.5%（固有値 3.532），第2主成分 20.7%（固有値 1.453），第3主成分 13.2%（固有値 1.06）であった。

Figure 2 には 98 個の各表現を身体感覚の 3 つの主成分得点のプロットで示した（見やすさのため，代表的な表現にのみラベルを付した。図中の番号はアルファベットが Figure 4 のクラスタ番号に，数字が表現番号に対応している。また四角形で表されたプロットは各クラスタの平均を示す。Figure 3 も同様である）。

Figure 2 のとおり，第1主成分得点では｛ずきんずきんする，割れるような,...｝が高い正値であり強い痛みを表し，｛つん，つねられた,...｝などは負値で弱い痛みを表す。第2主成分得点は，｛むずむずする，広がるような，しびれた,...｝が高い正値を示し，皮膚表面の広範囲な痛みを表す。一方，負の得点の｛槍で突き通される，刃物で刺された，針で突かれた｝は範囲が狭く身体深くに生じる痛みを表す。また，第3主成分得点では，｛しびれた，ちくちく,...｝が高い正値を，{こわばった，膨らんでいく,...} が負値を示しており，前者は断続的な痛みを，後者は持続的な痛みを表すと考えられる。

痛みの認知的評価 認知的評価の 7 項目を痛みのイメージを構成する成分と考えて，平均評定値に対して主成分分析を行い，認知的評価の主成分を求めた。固有値 1 以上の成分を抽出した結果，2 つの主成分が得られた。第1主成分では，重苦しい（以下括弧内は負荷量を示す：.920），圧迫感が強い（ .905），張り詰めた（ .782），異物感が強い（ .743），堅い（ .672）の 5 項目で高い正の負荷量が得られており，“圧迫痛”を表すと考えられる。第2主成分では，鋭い（ .846），堅い（.619）で正，熱い（-.695）で負の負荷量が得られ，“鋭利痛”を表すと解釈できる。寄与率は第1主成分 48.8%（固有値 3.42），第2主成分 30.3%（固有値 2.12）であった。認知的評価に関して，各表現がどのような特徴を持つかを示すため，主成分得点をプロットしたものを Figure 3 に示す。

Figure 3 から，第1主成分得点が正の｛鉛が埋め込まれた，がんがん，ずきんずきん,...｝は強い痛みとして，負の｛むずむず，ちかちか，ちくっ,...｝は弱い痛みとしてイメージされているといえる。また，第2主成分得点が正の｛凍る，きーん，冷ややか,...｝などの表現は鋭く堅いイメージを，負の｛はれた，ほてる，もやもや，じわー,...｝は熱く重いイメージを持つと考えられる。

身体感覚的特徴と認知的評価の関係 身体感覚的特徴と認知的評価の対応関係を調べるため，98 の痛み表現の主成分得点を変数として，相関係数を求めたところ，身体感覚的特徴と認知的評価の第1主成分（それぞれ，全般的強さ，圧迫痛の成分）はともに強度に関連する主成分であり，正の相関が見られた（r= .79, p<.01）。認知的評価の第2主成分（鋭利痛）とは中程度の負の相関を示した（r=-.32, p< .01）。また，身体感覚的特徴の第2主成分（皮膚表面での痛み）は，認知

的評価の第1，第2主成分の双方と中程度の負の相関があり（それぞれ，rs=-.48, -.49, ps<.01），表面的で広範囲での痛みは鋭さや圧迫感，緊迫感が弱いことが伺える。さらに，身体感覚的特徴と認知的評価の主成分の対応の良さを調べるため，正準相関分析を行った。第 1，第2正準相関係数は，.93，.64 と有意な正相関を示し，身体感覚的特徴の3次元と認知的評価の2次元とはうまく対応づけられるといえる。また，この結果を竹内・宇津木（1988）の痛み表現空間と対応させると，身体的感覚的評価と認知的評価の第1主成分は，“痛みの強さ”次元に対応し，第2, 3主成分は“痛みの周期性”にほぼ対応する。

痛み表現のクラスタ　痛み表現を身体感覚的特徴と認知的評価に基づいて分類するため，クラスタ分析を行った。分析には，身体感覚的特徴の3つの主成分得点と認知的評価の2つの主成分得点を用いた。また，クラスタの凝集法にはWard 法を，距離の指標にはユークリッド距離を用いた。得られた樹形図を Figure 4 に示す。

クラスタ数が 11 の水準を,結果の解釈がしやすいため痛みの下位分類として採用した（各クラスタの平均主成分得点は Figure 2, 3 のプロットを参照)。

Figure 4 に示すように，まず痛み表現は，強い痛みを表すクラスタ（A-C）と比較的弱い痛みを表すクラスタ（D-K）に分かれる。また，対応分析の結果（Figure 1）が示すように身体部位と痛み表現クラスタ間にも，ある程度の対応関係がある。おおむね，胸・腹部にはクラスタ A, B, C, H の表現が，手腕，足脚，関節や皮膚にはE, I, J,K が，頭，歯にはA, B, C, D が用いられやすい傾向がある。また，クラスタ F は胸部，腹部，のど，G は頭部と肩・腰にというように複数の部位に対し使用される表現もある。

クラスタ (A-C) はクラスタ A,B とクラスタ C に大きく2つに分かれる。クラスタ A と B は，ともに強い痛みを表現する“○○のような”という直喩表現が多い。とくに，クラスタ A は，容器としての身体組織を鈍器（ハンマーでなぐられたような）により圧迫（押しつぶされるような）あるいは破壊（割れるような）する“身体容器＋鈍器比喩”に基づく表現が多い。これらは，頭・胸・腹部などの深く長い痛みを表現している。それに対して，クラスタ B は，容器としての身体組織を鋭利な凶器（キリでもみこまれるような，刃物で刺されたような）によって，突き刺されたり，切り裂かれたりする“身体容器＋凶器比喩”による表現で構成される。これらは，鋭い痛みを示し，胸・腹部の痛みを表す。クラスタ C には，クラスタ B と同じく，容器としての身体の鋭利な刃物による損傷を表す直喩表現とともに擬態語（きりきり，ずきずき）が含まれる。これらの表現は，胸・腹部の痛みに加え，頭部や歯の痛みも表現する。

以上の結果は，頭・胸・腹部，歯とも強い痛みを経験しやすい部位ではあるが，その痛みの身体感覚的特徴および認知的評価は部位ごとに異なっており，それぞれにある程度特化した表現が用いられることを示唆する。

弱い痛みを表す表現は，まず D, E で構成されるクラスタとそれ以外（F-K）とに分かれる。D および E は，あまり強くはないが鋭い痛みを表す表現群である。クラスタ D には，歯痛，冷水痛のような瞬間的な痛みを示す“氷比喩”（ひやりとする）や“電気比喩”（電気が走るような）が含まれる。一方，クラスタ E には皮膚表面の小さな痛みを針による刺激で表す“針比喩”に基づく｛ちくっ，つん,...｝等の擬態語が含まれる。これらは，弱い痛みを外的な刺激物で表現した比喩だが，クラスタ D が頭部や歯の痛みを，E は皮膚や目の痛みを表すといった使い分けが見ら

れる。クラスタF, Gは，熱や圧迫感を伴うあまり強くない持続する痛みを表現する。Fには胸やのどの持続的痛みを示す“焼けるような”などの“燃焼比喩”が，Gには頭部や肩のこわばりや凝りに関する表現が含まれる。クラスタH, Iは断続的に続く広範囲での弱い痛みを表す。Hは，頭部，目，腹部など広範囲での痛みであり，体内の“ぐりぐりする，じんじんする”，異物が“広がるような”“じわーっとする”などの“異物比喩”が含まれる。Iは手腕，足脚などやや狭い範囲の痛みであり，“しびれたような，びりびりする,...”等弱いしびれを表す“電気比喩”で構成される。クラスタJには，皮膚表面の，断続的で堅く緊迫感を持つ痛みを表す“ちくちく，ひりひり”などの擬態語や“すれるような”といった“摩擦比喩”表現が含まれる。クラスタKは，歯，手足関節などの鈍いしびれやうずきを表す“びーんとする”“しみるような”などの広がるような“異物比喩”による表現が含まれている。

このように，全般的には，クラスタごとにある程度類似した比喩，擬態語表現が集まっている。しかし，比喩の種類とクラスタとの対応は一意ではない。例えば，外部からの圧迫に基づく“身体容器＋鈍器”比喩表現は，強度が強いときにはAに含まれる（締めつけられる，押しつぶされる）が，弱いときにはFに出現する（圧迫されたような，ぎゅーとする）。そして，前者は外部刺激による身体（組織）破壊を表す表現（ハンマーで殴られた，えぐられる等）と，後者は“燃焼比喩”表現（焼ける，やけどする等）と同じクラスタに入っている。これは，痛みの表現は，部位や身体感覚的特徴，認知的評価と一対一の対応ではなく，ゆるやかな対応関係を持ちながら，柔軟に使用されていることを示唆する。

考　察

本研究の結果は以下のことが明らかになった。(a) 痛みの身体感覚的特徴と認知的評価の間には，痛みの強さを中心に対応関係が認められる。(b) 痛みの身体感覚的特徴および認知的評価に基づいて，痛み表現は11のクラスタに分けられる。また，各クラスタに含まれる比喩表現および擬態語にはある程度の一貫性が認められる。この傾向は，感情の比喩研究の結果（たとえば，楠見, 1986; Lakoff, 1987）と一致する。(c) また，痛み表現クラスタと痛みを感じる身体部位の間には対応関係が見られる。すなわち，あるクラスタの表現は身体の特定部位に特によく使用される傾向がある。(d) しかし，一貫性は完全ではなく，痛みの部位と強さ等に応じて，それぞれに特化した比喩表現が存在している可能性が伺われる。

上記の結果は，痛みの慣用表現は，身体部位や身体感覚的特徴と，それらに基づく認知的評価に基づいて，一部で様々な比喩が混在してはいるものの，全般的には一貫した比喩表現が用いられることを示す。この結果は，比喩表現の基盤として身体性が存在しているという認知言語学の主張（Lakoff & Johnson, 1999）を部分的に支持する。しかし，同時に，本研究の結果は，痛みを表すのに使用される表現と，実際の身体感覚的特徴や認知的評価との間には詳細な対応づけがあり，“腹部への痛みは圧迫である”といった単純な一般化はできないことも示している。このような結果は，身体性を重視する認知言語学の主張に反する訳ではない。しかし，比喩の基盤が身体にあるというだけでは不十分であり，表現ごとにどのような性質を持っており，どのような身体性と結びついているかを明らかにする必要があることを示唆する。

最後に，本研究の今後の課題と意義について述べる。最大の問題は，本研究の調査参加者が健常な大学生に限られたことである。そのため，痛みの経験頻度はあまり高くなく，重度の痛みを表す表現に対しては明確な反応を得られなかった可能性がある。さらに，本研究の結果を，多様な疾病の患者を含むより広い人々にどの程度一般化できるかは今後の課題である。また，本研究のデータ収集はすべて自己報告に基づいており，実際の痛みの原因と言語表現との対応関係を明確にするには至っていない。実験的手法として痛み刺激を実験参加者に与えたり，痛みを感じている患者の臨床的所見を得たりすることは倫理上の制約もあり容易ではないが，身体性と比喩的慣用表現の関係を論じるには必要な課題である。

脚　注

[1] 本研究は平成 15 年度文部科学省科研費補助金・萌芽研究（研究代表者・子安増生：課題番号 15650045）の助成を得た。なお，本研究の一部は，日本認知科学会第 21 回大会（2004 年 7 月）において発表された。

[2] 調査の実施にあたり，瀧ヶ崎隆史先生（日本工業大学），音山若穂先生（郡山女子短期大学）にご協力を頂きましたことを感謝致します。

[3] 本研究では比喩という語を直喩，換喩などを含む広義の意味で使用する。なお，直喩は，“のような”などの比喩指標を含んだ類似性に基づく比喩，換喩は時間的・空間的近接性に基づく比喩表現を指す。ここで指摘したように，痛みの慣用表現には，直喩というよりは換喩と見なした方が適切な表現が多数存在する。しかし，ある表現が比喩なのかどうかを明確に規定することは難しい。たとえば，熱刺激がない時に使用された“焼けるような痛み”は，事実とは異なることに言及しているため比喩と見なしうる。しかし，ある種の神経繊維（Aδ 線維）は強い圧と熱刺激の両方に反応すると言われており（東山ほか, 2000），生理的な反応としての痛みのレベルでは字義どおりの表現になっていると考えることもできるかもしれない。このような事情から，本研究では比喩という語もまた緩やかな意味で使用する。つまり，“虫歯の痛み，画鋲を踏んだ痛み”等のように痛みの原因そのものによって痛みを表す字義通り（literal）の表現以外を用いて，痛みの特徴を形容する語句全般を“痛み”の比喩表現とする。

[4] 男女差について検討するため，98 個の痛み表現それぞれについて，経験頻度の平均値について t 検定を行った結果，以下の 15 項目で有意な差があった：ずきんずきん，きりきり，ぐりぐり，しくしく，ずきずき，針で突かれた，ずーん（以上，$p < .01$），ひきつるような，割れるような，じーん，引き締められる，もやもや，絞ら，じわっ，うずく（以上，$p < .05$）。“ひきつるような”を除く 14 項目では，女性の方が男性に比べ経験頻度が高く，生理痛などの影響があると考えられる。しかし，調査参加者数が多く有意差が得られやすいこと，また全 98 項目中有意な差があったのは 16%以下に留まることから，以降の分析は男女をまとめて行った。その理由は，本研究の目的が，男女に共通する痛み表現の知覚的，認知的特徴を明らかにすることにあるためである。

引用文献

浅野鶴子 (編) (1978). 擬音語・擬態語辞典 角川書店(Asano,T.)

Gibbs, R. W., & Franks, H. (2002). Embodied metaphor in women's narrative about their experience with cancer. *Health Communication*, **14**, 139-165.

Hasegawa, M., Mishima, M., Matsumoto, I., Sasaki, T., Kimura, T., Baba, Y., Senami, K., Kanemura, K., Takano, O., & Shibata, T. (2001). Confirming the theoretical structure of the Japanese version of the McGill Pain Questionnaire in Chronic Pain. *Pain Medicine*, **2**, 52-59.

東山篤規・宮岡徹・谷口俊治・佐藤愛子 (2000). 触覚と痛み ブレーン出版 (Higashiyama, S.,Miyaoka,T., Taniguchi,& Satow, A.)

Jairath, N. (1999). Myocardial infraction patients' use of metaphors to share meaning and communicate underlying frames of experience. *Journal of Advanced Nursing*, **29**, 283-289.

改田明子 (2001). 身体症状に関する認知の研究 二松学舎大学論集, **44**, 37-57. (Kaida,A)

楠見 孝 (1996). 感情概念と認知モデルの構造 土田昭司・竹村和久(編)感情と行動・認知・生理 誠信書房 pp.29 -54. (Kusumi,T.)

Lakoff, G. (1987). *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind*. Chicago: University of Chicago Press.

Lakoff, G., & Johnson, M. (1999). *Philosophy in the Flesh: The Embodiment Mind and its Challenge to Western Thought*. New York: Basic Books.

Melzack, R. (1975). McGill Pain Questionnaire: major properties and scoring methods. *Pain*, **1**, 277-299.

Morris, D.B. (1991). *The culture of pain*. California : University of California Press. (モリス, D.B. 渡邉勉, 鈴木牧彦 (訳) (1998). 痛みの文化史 紀伊國屋書店)

NTT コミュニケーション科学研究所(監修) (1997). 日本語の語彙大系 岩波書店 (NTT Communication Science Laboratories)

Satow, A., Nakatani, K., & Taniguchi, S. (1988). Analysis of perceptual characteristics of pain describing words caused by occupational cervicobrachial disorder and similar disease. *Japanese Psychological Research*, **30**, 132-143.

Satow, A., Nakatani, K., Taniguchi, S., & Higashiyama, A. (1990). Perceptual characteristics of electrocutaneous pain estimated by the 30-word list and visual analog scale. *Japanese Psychological Research*, **32**, 155-164.

佐藤愛子・奥富俊之・谷口俊治・宮岡徹・東山篤規・畑山俊輝(1991). 痛みの話－生活から治療から研究から－日本文化科学社 (Satow, A., Okutomi, T., Nakatani, K., Taniguchi, S., Miyaoka, T., Higashiyama, A.& Hatakeyama, A.)

Schreiner, A. S.・ 守本とも子・俵由美子 (2002). 痛みは5番目のバイタルサインである (1)高齢者の慢性的な痛みのアセスメント 看護学雑誌, **66**, 78-85. (Schreiner, A.S., Morimoto,T. &

Tawara,Y. Pain, the Fifth Vital Sign: Assessment and nursing interventions for chronic pain among nursing home residents with dementia. *Japanese Journal of Nursing*, **66**, 8-85.)

Söderberg, S., & Norberg, A. 1994 Metaphorical pain language among fibromyalgia patients. *Scandinavian Journal of Caring Science*, **9**, 55-59.

竹内晴彦・宇津木明男(1988). ネットワークモデルによる「痛み」の概念分析 計量国語学, **16**, 233-245. (Takeuchi, H. & Utsuki, A.)

山中祥男(1987). 痛みの研究における心理学の二, 三の問題(VIII) — 痛みの言語表現とその分析法の考案— 上智大学心理学年報, **12**, 25-33. (Yamanaka, Y.)

山中祥男・山崎重明 (1989). 痛みの研究における心理学の二, 三の問題(IX) — 痛みの言語表現とその分析法の考案 (その 2) — 上智大学心理学年報, **13**, 41-48. (Yamanaka, Y. & Yamazaki, S.)

山口翼(編) (2003). 日本語大シソーラス　大修館書店 (Yamaguchi, T.)

山口仲美(編) (2003). 暮らしのことば 擬音・擬態語辞典　講談社 (Yamaguchi, N.)

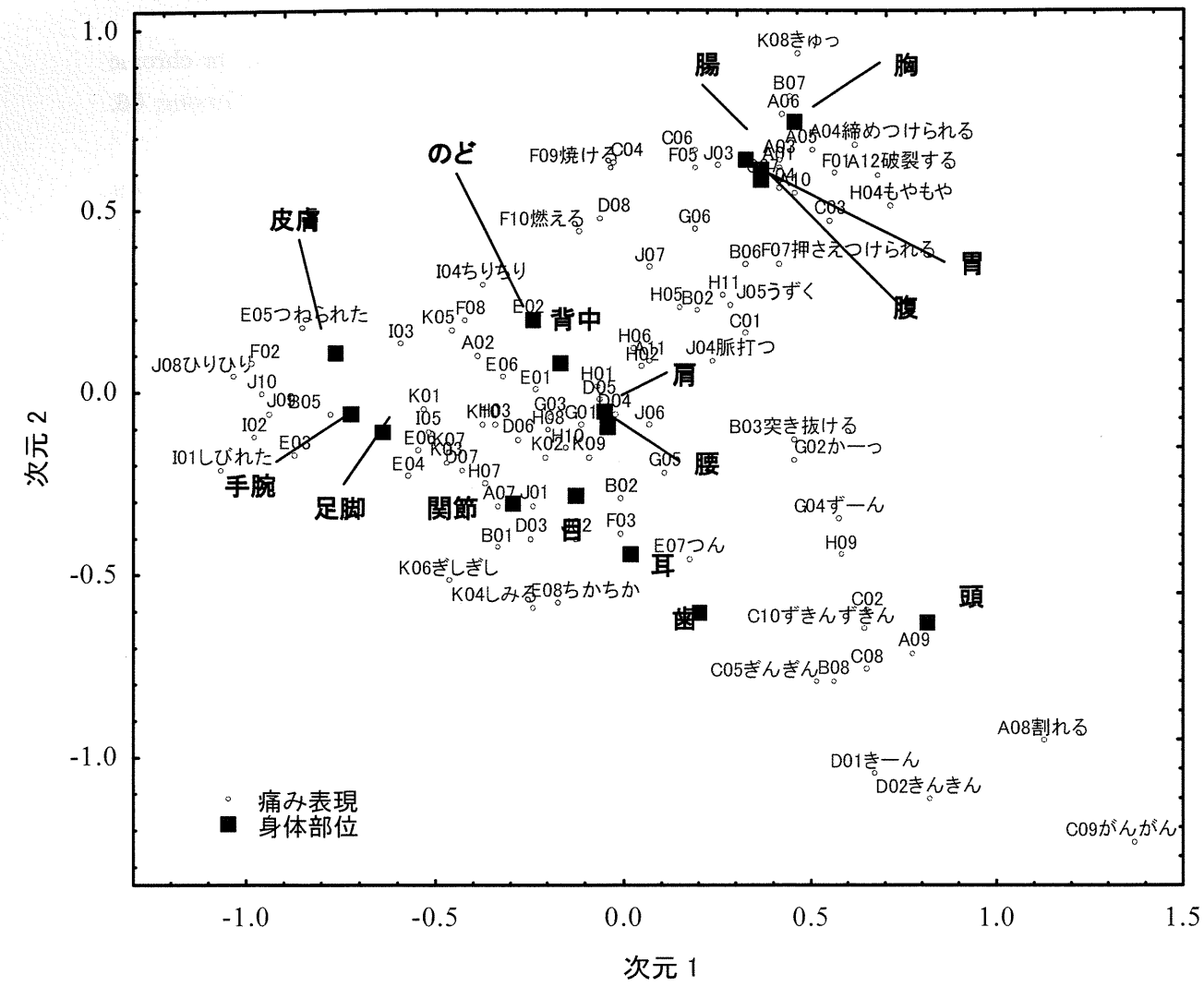


Figure 1 対応分析による痛み表現と身体部位の対応関係

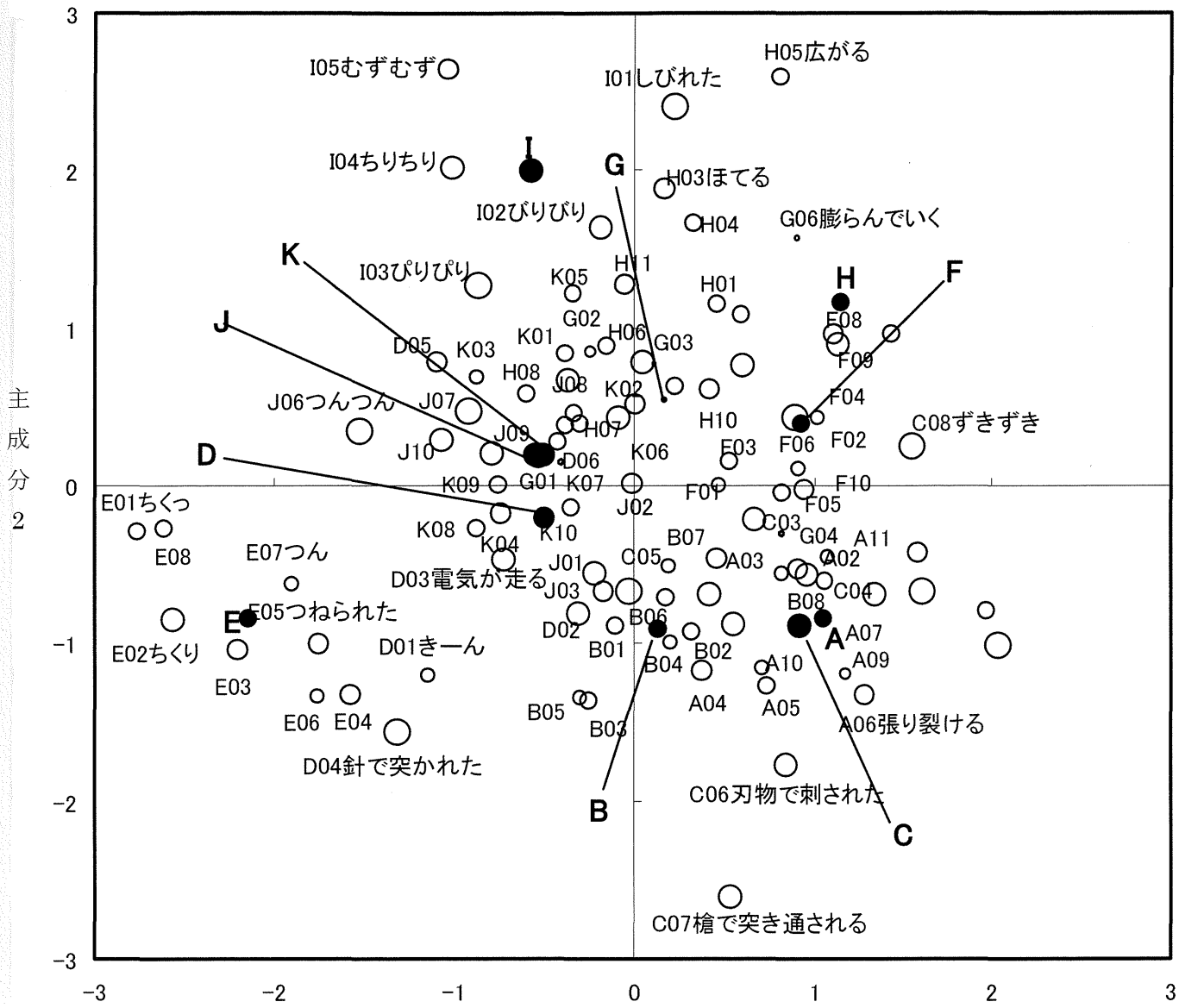


Figure 2 痛み表現の身体感覚的特徴に基づく主成分得点のプロット

円の直径は第 3 主成分得点を表す。**A—K** は **Figure 4** のクラスタを示す。

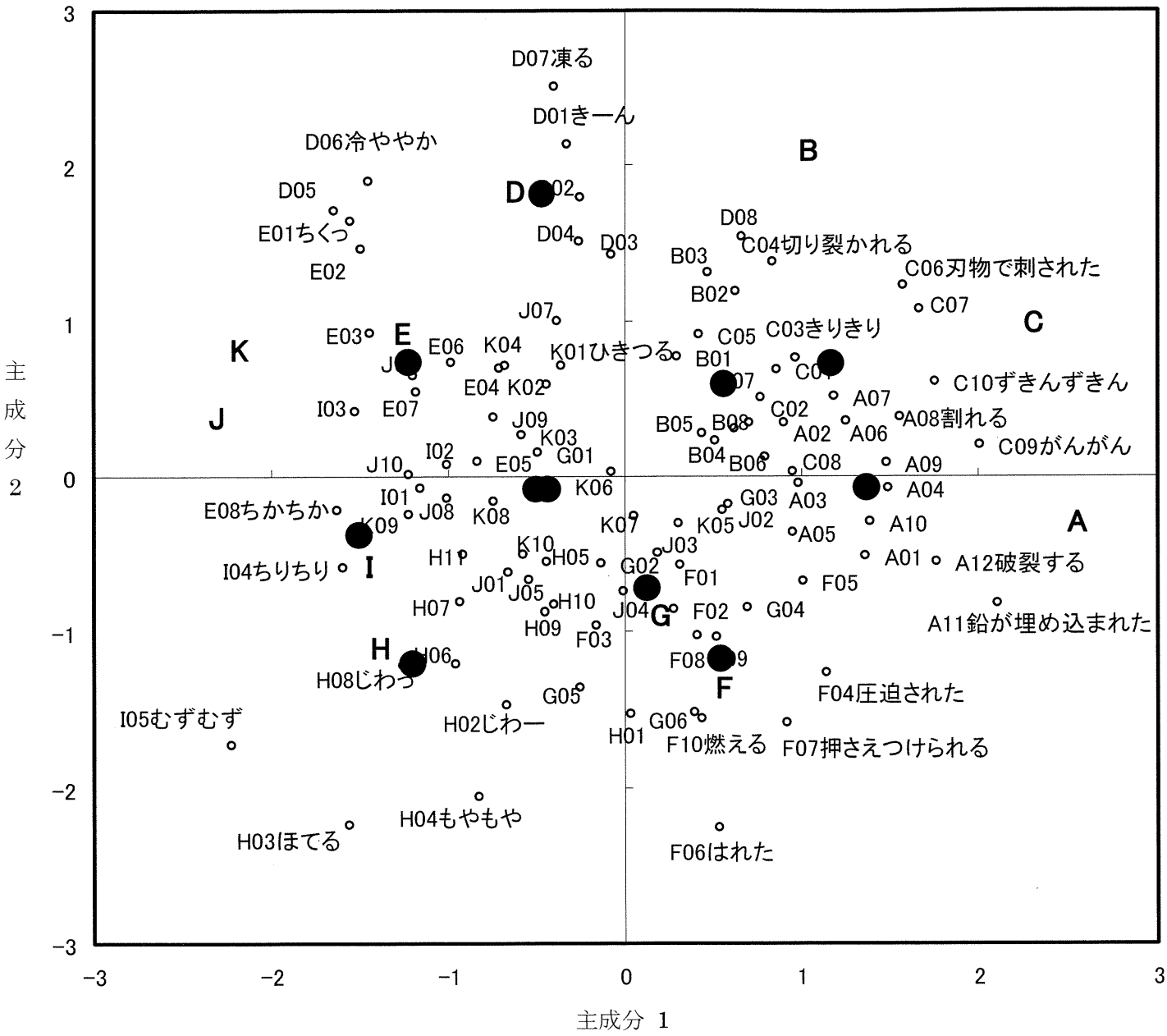


Figure 3 痛み表現の認知的評価に基づく主成分得点プロット
A—K は **Figure 4** のクラスタを示す.

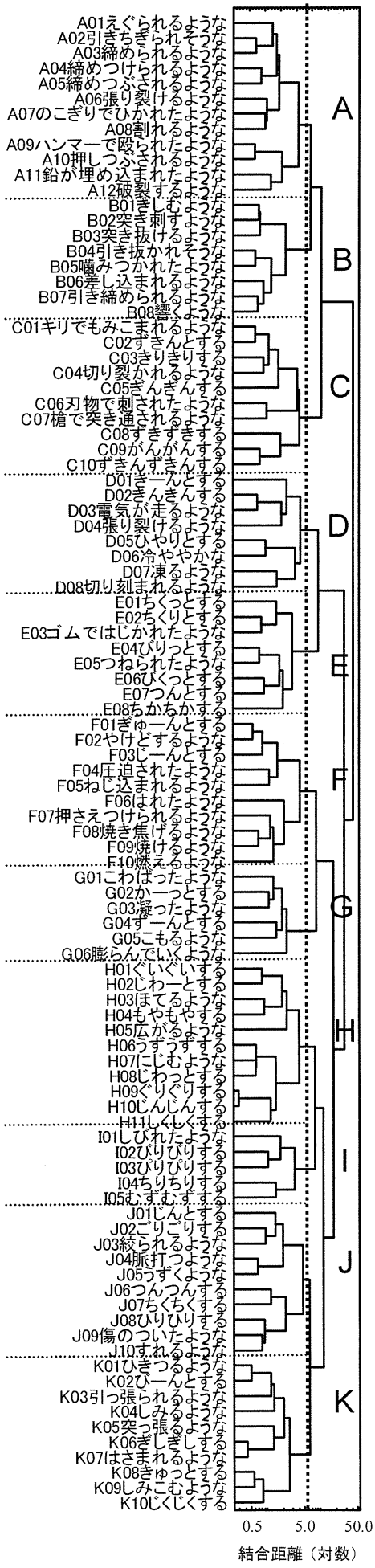


Figure 4　痛み表現の身体感覚的特徴と認知的評価の主成分得点によるクラスタ

Differences between acting as if one is experiencing pain and acting as if one is pretending to have pain among actors at three expertise levels

Hanae Ando & Masuo Koyasu
(Kyushu University) (Kyoto University)

Abstract

The purpose of this study was to examine how acting skills develop by comparing acting quality between novice, intermediate, and junior expert actors. Actors at each expertise level played 4 scenes; "not having any pain," "suffering pain," "pretending to feel pain," and "pretending not to feel pain." Their performances were videotaped, and then rated by 46 university students (Study 1) and another 40 university students (Study 2), respectively. Study 1 revealed that, contrary to our hypotheses, the less experience actors have, the easier it was for the participants to identify the specific scene they were playing. Study 2 was performed to help explain these findings, and indicated it may have been related to the overall quality of acting in the expert relative to the novice actors. Specifically, we found that junior expert actors were viewed as more realistic in their acting and better in their performances than those of the other less experienced groups. The subtleties involved in high quality acting may make the actors' intentions less clear to the audience. On the other hand, less experienced actors might be so conscious about the audience that their performances are exaggerated. The findings suggest that in order to become an expert actor, it is important to act in accordance with what is needed in the scene, taking not only the audience but also the settings as a whole into account.

Key words: expertise, actor, pain, pretense, facial expression

Pain is a subjective sensation that can be difficult to communicate to others. However, accurate communication about pain is necessary in order to obtain appropriate help from others such as doctors. Although a number of rating scales and questionnaires have been developed that patients can use to describe their pain (e.g., Melzack, 1975; Bieri, Reeve, Champion, Addicoat,& Ziegler, 1990), there remains the possibility that patients might over- or under-report their pain; they can tell doctors that they are suffering from pain even when they are not, or conversely, may deny experiencing pain even when they are suffering a great deal.

Because it is possible to exaggerate about or understate pain, we use not only verbal information but also non-verbal information when judging the pain of others. Some previous studies have shown that non-verbal behaviors, especially facial expressions, can show pain more accurately than words do (e.g. Craig, 1992; Jacox, 1980; Poole & Craig, 1992). Poole & Craig (1992), for example, found that people estimate others' pain as being less intensive when watching facial expressions of pretending to have pain than when watching facial expressions that truly indicate pain. Effectively pretending to suffer from pain is not necessarily easy, and others might be able to discover our pretense if they can read our facial expressions, especially if they are experienced health care providers (e.g., nurses, see Jacox, 1980).

Given the complexities involved in pain communication in the clinical setting, one might expect that a high level of acting skill would be needed to communicate pain by actors. Professional acting is different from the acting people do in daily life. Two kinds of observers, the audience and the co-actors on stage, are present for actors' acting, while the observers of acting in daily life are only the communication partners. Actors never give a glance at the audience most of the time and behave as if there doesn't exist audience, however, their performances are always witnessed by audience, and in fact, they are very sensitive to the attention of audience (Brockbank, 1985). Because of this difference, actors are sometimes required to act as a person who is acting. In some acting situations, the character played by an actor might not be satisfied with what a co-actor is doing, but may need to pretend that he or she is. In such a scene, the actor has to act as a person who is not happy, but is pretending to be so. In other words, the actor in this complex scene needs to convey to the co-actor that he or she is happy and satisfied with the co-actor, yet simultaneously convey to the audience that he or she is only pretending to be happy and satisfied. In such a scene, the message to the audience and the message to the co-actor are different. Performing a double message such as this likely requires a great deal of acting skill.

In this study, we use two types of scenes, more simple scenes that have a single message for the actor to communicate, and more complex scenes that ask the actor to communicate double messages. The purpose of this study is to examine the process of acting skill development by comparing actors at different experience levels in their ability to present more straightforward (with a single message) versus more complex (with double messages) experiences around the issue of pain. Specifically, in two studies, we sought to compare three groups of actors (*novice actors* with less than one year's acting experience, *intermediate actors* with one to five years' experience, and *junior expert actors* with more than five years of experience) with respect to their ability to communicate direct experience (pain versus no pain) and more complex experience (pain versus no pain, but pretending otherwise).

In terms of classifying the subject actors, we followed a previous study that investigated the expertise of actors (Ando, 2002). It has been revealed in various fields that learners need strict training for at least ten years to be experts (e.g., Ericsson, 1996), and Noice & Noice (1997) have suggested that this rule is adopted for actors. For this reason, we call a group of actors who have more than five years' experience "junior experts" not "experts."

Videotaping Actors' Performances

Actors

We videotaped 36 Japanese actors' performances. They were divided into 3 groups in accordance with length of their acting experience; 12 novice actors with less than one year's experience, 12 intermediate actors with one to five years' experience, and 12 junior expert actors with more than five years' experience. In each group, half of the actors were male, and the other half were female. Mean age, mean period of acting experience, mean times of acting, and mean times of directing of each groups are shown in Table. 1.

Table 1. *Details about Actors*

Group	Mean age	Mean period of acting experience	Mean time of acting	Mean time of directing
Novice	19.0	6 months	1.1	0
Intermediate	21.8	2 years and 11 months	7.8	1.4
Junior expert	30.3	11 years and 3 months	36.6	9.8

Scenario

In this study, we use two types of scenes, scenes that have a single message, and more complex scenes that have double messages. Each actor played all four scenes. In the all scenes, the main character that actors played are asked whether he / she has a stomachache or not by his / her sister. In Scene 1 (the "not having any pain" scene), he / she answers "I don't have any pain" because he / she actually does not feel any pain; in Scene 2 (the "suffering pain" scene), he / she answers "I have some pain" because he / she can actually feel pain; in Scene 3 (the "pretending to feel pain" scene), he / she answers "I have some pain" even though he / she is not experiencing any pain; in Scene 4 (the "pretending not to feel pain" scene), he / she answers "I don't have any pain" even though he / she does. Scene 1 and Scene 2 have a single message, and Scene 3 and Scene 4 have double messages. The specific text for these scenes (translated from Japanese) were as follows.

> The character you're going to play had a bad stomachache yesterday. It's a holiday today, and the character and his / her sister have planned to go to the movies today. When he / she gets up in the morning, the sister ask him / her "Do you still have a stomachache?" Scene 1: The character does not have a stomachache now, so please say "I don't have any pain" as the character. When you act, please keep in mind that you have to convey audience that you really do not have a stomachache. Scene 2: The character still has a stomachache now, so please say "I have some pain" as the character. When you act, please keep in mind that you have to convey audience that you really have a stomachache. Scene 3: The character does not have a stomachache now, but he / she is unwilling to go to the movies, so please say "I have some pain" as the character. When you act, please keep in mind that you have to convey audience that you are pretending to have a stomachache even though you do not have a stomachache in fact. Scene 4: The character still has a stomachache now, but he / she does not want to depress the sister, so please say "I don't have any pain" as the character. When you act, please keep in mind that you have to convey audience that you are pretending not to have a pain even though you do have a stomachache.

Procedure

Actors participated individually. At first, they read the scenario of one of the four scenes, and were given explanation about the scene. They then practiced the scene for 1 minute. After the practice, they acted in front of a video camera, and their performances were videotaped. The experimenter, the first author, said the line of the sister ("Do you still have a stomachache?"), and the actors acted as if the sister was standing at the place of the video camera. They were instructed to act while sitting still, without using their arms or hands, and their heads and chests were videotaped. After the performances, they

were asked to talk about their acting strategies.

We repeated these procedures ([1] 1 minute's practice, [2] performance, and [3] talk about acting strategies) three times for each scene. After three versions of the each scene were videotaped, actors watched the performances on a monitor, and chose the single performance that they thought was best. We used only these best performances in Study 1 and Study 2. We repeated this procedure for each of the four scenes, and the order of the scenes was counter-balanced among actors.

Study 1

We conducted Study 1 to verify two hypotheses about the expertise of actors playing scenes that have a single message or double messages. The first hypothesis is about the differences among the three groups of actors. Ando & Koyasu (2004) compared facial expressions of actors with those of non-actors and found that actors could convey their intentions to the audience more strongly than non-actors. Based on these findings, we predicted that acting experience would be associated with ability to convey intention to the audience. That is, the audience would more easily identify the specific scenes when watching performances by the junior expert actors compared to the less experienced actors, and scene identification would be easier when the scenes were performed by intermediate actors compared to novice actors. The second hypothesis concerned the differences among the four scenes. We predicted that scenes that have double messages (Scenes 3 and 4) would be more difficult to perform well than scenes that have a single message (Scenes 1 and 2). Therefore, audience could easily understand the actors' intention when watching scenes with a single message but find it more difficult to understand scenes containing double messages.

Method

Participants. Forty-six undergraduate and graduate students of a university in Japan participated in this study. Twenty were male and twenty-six were female. Their mean age was 21.4 years old.

Material. We used 144 videotaped performances, which were judged by the 36 actors to be their "best" performances of the four scenes. The videotaped performances were edited so as to start at the moment when the experimenter finished saying the sister's line, "Do you still have a stomachache?" and end at the moment 1 second after the actor finished saying the character's line, "I have some pain" or "I don't have any

pain."

The performances of Scenes 1 and 4 (in both scenes, actors said, "I don't have any pain") were mixed, and those of Scenes 2 and 3 (in both scenes, actors said, "I have some pain") were mixed. Therefore, the 72 scenes in which actors said, "I don't have any pain" and the 72 scenes in which actors said "I have some pain" were presented separately to the participants.

Procedure. The experiment was conducted in small groups from two to fifteen participants. They watched the performances projected on a 100-inch screen, and responded to four questions about each performance. When they watched a performance in which an actor said, "I don't have any pain" (Scenes 1 or 4), they were asked to indicate whether the actor really did not have any pain (Scene 1) or the actor was pretending not to have pain (Scene 4). Likewise, when participants watched a performance in which an actor said, "I have some pain" (Scenes 2 or 3), they indicated whether the actor really did have some pain (Scene 2) or the actor was just pretending (Scene 3). Participants then evaluated: 1) how confident they were in their choices; 2) how real the actor's performance was; and 3) how severe the pain the actor was communicating. The latter three items were evaluated according to a seven-point scale.

About a half of the participants watched Scenes 1 and 4 first, and the other half watched Scenes 2 and 3 first. The order of the performances was counter-balanced.

Results

Scene identification. Participants were requested to identify the four scenes for every performance of every actor. The average number of correct answers was calculated for each scene and each group of actors, and is shown in Figure 1.

An analysis of variance was used with one between-subjects factor, actors' groups (novice, intermediate, and junior expert), and one within-subjects factor, scenes (Scene 1, 2, 3, and 4). The main effect of actors' groups was significant, $F(2, 90) = 25.76$, $p < .01$. Ryan's post-hoc test suggested that the number of correct scene identification answers for novice actors was larger than that for intermediate actors, and that for intermediate actors was larger than that for junior expert actors ($p < .05$). The main effect of scenes was also significant, $F(3, 135) = 28.25$, $p < .01$. The results of Ryan's post-hoc test ($p < .05$) indicated that, overall, the number of correct answers for Scene 4 was larger than those for the other three scenes.

There was also a significant interaction between two factors, $F(6, 270) = 12.88$, $p < .01$, with further analysis showing significant simple main effects of actors' groups on

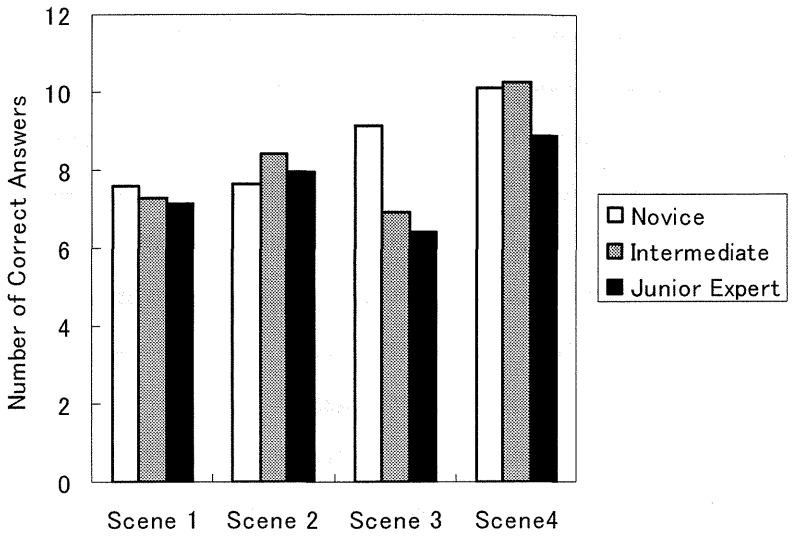


Figure 1. Average number of correct answers (max=12) participants could identify for each scene.

Scene 2, F (2, 360) = 3.41, $p < .05$, on Scene 3, F (2, 360) = 46.03, $p < .01$, and on Scene 4, F (2, 360) = 12.75, $p < .01$. Ryan's post-hoc test ($p < .05$) revealed the following significant effects: the number of correct answers in Scene 2, intermediate actors > novice actors; in Scene 3, novice actors > intermediate actors = junior expert actors; and in Scene 4, novice actors = intermediate actors > junior expert actors.

Further analyses also indicated that simple main effects of scenes on all three actors' groups were significant: the simple main effect on novice actors was F (3, 405) = 20.12, $p < .01$; on intermediate actors, F (3, 405) = 30.15, $p < .01$; and on junior expert actors, F (3, 405) = 15.20, $p < .01$. Ryan's post-hoc test ($p < .05$) revealed the following significant effect; the number of correct answers for novice actors: Scene 4 > Scene 3 > Scene 2 = Scene 1; for intermediate actors, Scene 4 > Scene 2 > Scene 1 = Scene 3; and for junior expert actors, Scene 4 > the other three scenes.

To summarize the results concerning scene identification, there were significant differences among the three groups of actors in the three scenes except Scene 1. However, the differences found were contrary to the first hypothesis. Specifically, in Scenes 3 and 4, the participants found it more difficult to identify the specific scene for the junior expert actors than the novice and intermediate actors. There were also differences among the four scenes that were contrary to the second hypothesis. All three groups of actors were equally successful in conveying their intention in Scene 4, which contained double messages.

Confidence. Participants evaluated how confident they were in their choice of

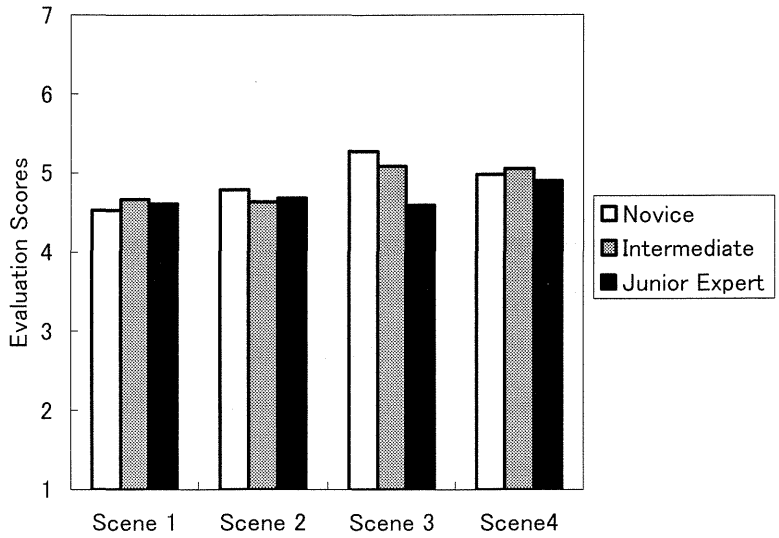


Figure 2. Average evaluation scores participants evaluated how confident they were in scene identification.

scene identification. The average of their evaluation scores was calculated for each scene and each group of actors, and is shown in Figure 2.

An analysis of variance was used with one between-subjects factor (actors' groups) and one within-subjects factor (scenes). The main effect of actors' groups was significant, $F(2, 90) = 8.57$, $p < .01$, and Ryan's post-hoc test indicated that participants were more confident in their choice when identifying performances of novice and intermediate actors than when identifying performances of junior expert actors ($p < .05$). The main effect of scenes was also significant, $F(3, 135) = 22.22$, $p < .01$. Ryan's post-hoc test ($p < .05$) revealed that participants were more confident when identifying Scenes 3 and 4 than when identifying Scenes 1 and 2.

There was also a significant interaction between two factors, $F(6, 270) = 12.14$, $p < .01$, with further analysis showing that the simple main effects of the actors' groups on Scene 3 was significant, $F(2, 360) = 38.10$, $p < .01$. Ryan's post-hoc test ($p < .05$) indicated that only in Scene 3, participants were more confident in their choice when identifying performances of novice and intermediate actors than when identifying performances of junior expert actors.

Further analysis also showed that simple main effects of scenes on all three groups of actors were significant: the simple main effect on novice actors was $F(3, 405) = 28.72$, $p < .01$; on intermediate actors, $F(3, 405) = 16.65$, $p < .01$; and on junior expert actors, $F(3, 405) = 7.29$, $p < .01$. Ryan's post-hoc test ($p < .05$) revealed the following significant

effect: evaluation scores for performances of novice actors, Scene 3 > Scene 4 > Scene 2 = Scene 1; for performances of intermediate actors, Scene 3 = Scene 4 > Scene 2 = Scene 1; for performances of junior expert actors, Scene 4 > Scene 1, and Scene 4 > Scene 3.

To summarize the results about confidence, differences among the three actors' groups were found only in Scene 3. For this scene, participants could judge novice and intermediate actors' performances with more confidence than they could junior expert actors' performances. In addition, when identifying performances of novice and intermediate actors, participants could judge scenes which contained double messages (Scenes 3 and 4) with more confidence than the scenes which had a single message (Scenes 1 and 2).

Reality of performances. Participants evaluated how real the actors' performances were. The average of their evaluation scores was calculated for each scene and each group of actors, and is shown in Figure 3.

An analysis of variance was used with one between-subjects factor (groups of actors) and one within-subjects factor (scenes). The main effect of the actors' groups was significant, $F(2, 90) = 54.16$ $p < .01$, and Ryan's post-hoc test indicated that performances of the junior expert actors were more realistic than those of the intermediate actors, and those of intermediate actors were more realistic than those of the novice actors ($p < .05$). The main effect of scenes was also significant, $F(3, 135) = 61.70$, $p < .01$. Ryan's post-hoc test ($p < .05$) revealed that performances in Scenes 1 and 2 were more realistic than those in Scene 4, and those in Scene 4 were more realistic than those in Scene 3.

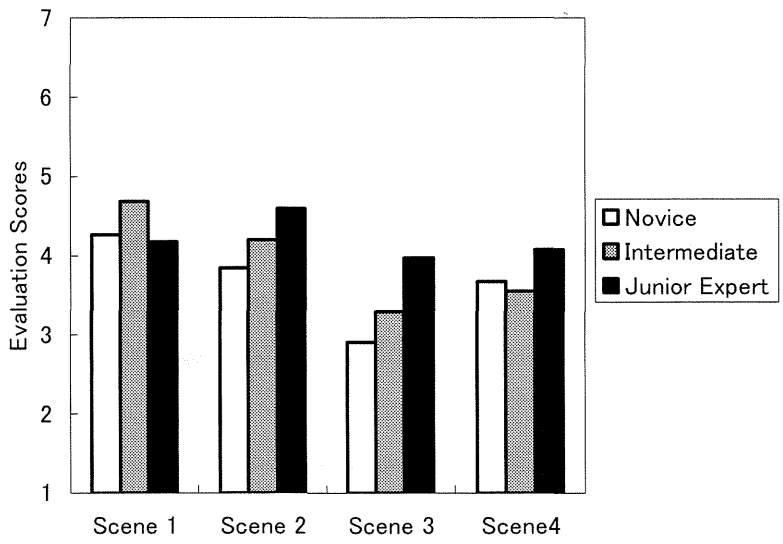


Figure 3. Average evaluation scores participants evaluated how realistic the actors' performances were.

There was also a significant interaction between two factors, F (6, 270) = 29.07, p < .01, with further analysis showing that simple main effects of the groups of actors on all four scenes were significant: on Scene 1, F (2, 360) = 19.10, p < .01; on Scene 2, F (2, 360) = 36.18, p < .01, on Scene 3, F (2, 360) = 75.68, p < .01; on Scene 4, F (2, 360) = 19.34, p < .01. Ryan's post-hoc test (p < .05) showed the following significant effects: evaluation scores in Scene 1, intermediate actors > novice actors = junior expert actors; those in Scene 2, junior expert actors > intermediate actors > novice actors; those in Scene 3, junior expert actors > intermediate actors > novice actors; and those in Scene 4, junior expert actors > novice actors = intermediate actors.

Further analysis also showed that simple main effects of scenes on all three of the groups of actors were significant: the simple main effect on novice actors was F (3, 405) = 58.81, p < .01, on intermediate actors, F (3, 405) = 72.32, p < .01, and on junior expert actors, F (3, 405) = 13.52, p < .01. Ryan's post-hoc test (p < .05) revealed the following significant effect: evaluation scores for performances of novice actors, Scene 1 > Scene 2 = Scene 4 > Scene 3; those for performances of intermediate actors, Scene 1 > Scene 2 > Scene 4 > Scene 3; and those for performances of junior expert actors, Scene 2 > the other three scenes.

To summarize the results concerning the reality of performances, we found significant differences among the three groups of actors with the performances of junior expert actors being judged as more realistic than those of intermediate and novice actors in Scenes 2, 3, and 4 but not Scene 1. Novice and intermediate actors' performances in the scenes that contained double messages (Scenes 3 and 4) were less realistic than their performances in the scenes that had a single message (Scenes 1 and 2); junior expert actors did not exhibit such a tendency.

Severity of pain. Participants evaluated how severe the pain was that the actors were expressing. The average of their evaluation scores was calculated for each scene and each group of actors, and is shown in Figure 4.

An analysis of variance was used with one between-subjects factor (groups of actors) and one within-subjects factor (scenes). The main effect of the groups of actors was not significant, F (2, 90) = 1.96, *n.s.*, whereas the main effect of the scenes was significant, F (3, 135) = 174.13, p < .01, and Ryan's post-hoc test (p < .05) revealed that actors expressed severer pain in Scene 2 than in Scenes 3 and 4, and not as well in Scenes 3 and 4 as in Scene 1.

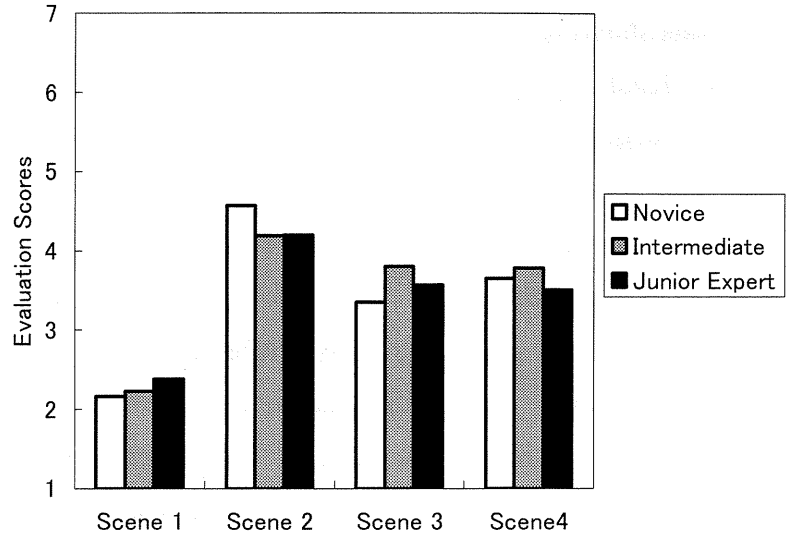


Figure 4. Average evaluation scores participants evaluated how severe pain actors expressed.

An analysis of variance was used with one between-subjects factor (groups of actors) and one within-subjects factor (scenes). The main effect of the groups of actors was not significant, F (2, 90) = 1.96, *n.s.*, whereas the main effect of the scenes was significant, F (3, 135) = 174.13, $p < .01$, and Ryan's post-hoc test ($p < .05$) revealed that actors expressed severer pain in Scene 2 than in Scenes 3 and 4, and not as well in Scenes 3 and 4 as in Scene 1.

There was also a significant interaction between two factors, F (6, 270) = 16.29, $p < .01$, with further analysis showing that the simple main effects of actors' groups on all four scenes were significant: on Scene 1, F (2, 360) = 4.31, $p < .05$; on Scene 2, F (2, 360) = 16.00, $p < .01$; on Scene 3, F (2, 360) = 17.47, $p < .01$; and on Scene 4, F (2, 360) = 6.45, $p < .01$. Ryan's post-hoc test ($p < .05$) showed the following significant effect: evaluation scores in Scene 1, junior expert actors > novice actors; those in Scene 2, novice actors > junior expert actors = intermediate actors; those in Scene 3, intermediate actors > junior expert actors > novice actors; and those in Scene 4, intermediate actors > junior expert actors.

Further analysis also showed that the simple main effects of the scenes on all three actors' groups were significant: the simple main effect on novice actors, F (3, 405) = 166.88, $p < .01$; on intermediate actors, F (3, 405) = 127.38, $p < .01$; and on junior expert actors, F (3, 405) = 96.88, $p < .01$. Ryan's post-hoc test ($p < .05$) revealed the following significant effect: evaluation scores for performances of novice actors were in the order of Scene 2 > Scene 4 > Scene 3 > Scene 1; those for the performances of intermediate

Table 2. *Correlations between Evaluation Items in Study 1*

	Scene identification	Confidence	Reality of performance	Severity of pain
Scene identification	1			
Confidence	.48**	1		
Reality of performances	−.20*	−.60**	1	
Severity of pain	.05	.22*	−.18*	1

* $p < .05$, ** $p < .01$

and junior expert actors were Scene 2 > Scene 3 = Scene 4 > Scene 1.

To summarize the results concerning pain severity, we found that the main effect of the groups of actors was not significant, and post-hoc test results for interaction were inconsistent among the four scenes. As for the differences among the four scenes, the results were consistent: actors in all three groups were better at expressing the severity of pain in Scene 2 and most poorly in Scene 1.

Correlation between evaluation items. Table 2 shows the correlation coefficients between the following evaluation items: scene distinction, confidence, reality of performances, and severity of pain.

Whether participants could discriminate the scene correctly or not showed a strong association with their confidence in scene discrimination, and was negatively associated with reality of the performances. There was a strong negative correlation between confidence and reality of performances, and a negative correlation between reality of performances and severity of pain. Confidence was significantly correlated with severity of pain.

Discussion

With regard to the communication of pain severity, actors of all three experience levels communicated the severest pain in Scene 2, and the least severe pain in Scene 1. This means that none of the groups of actors performed inadequately in regard to expressing serious pain in Scene 1.

The first hypothesis of this study was that the more experienced actors have, the more able they would be to convey their intention to their audience. However, contrary to this hypothesis, at least with respect to scene identification, participants were more

accurate when identifying the scenes that novice actors were playing, and were least accurate when identifying the scenes that junior expert actors were playing in Scenes 3 and 4. Also contrary to our prediction, in Scenes 1 and 2, the performances by junior expert actors were not identified more accurately than those of intermediate and novice actors. These findings suggest that the less experience actors have, the more obvious it is to audience which scene they are playing, especially, in the more complex scenes that have double messages. This finding was replicated in the analyses concerning confidence ratings, with the results suggesting that audience could identify scenes of the novice and intermediate actors with more confidence than those of junior expert actors in Scene 3, although in the other three scenes, no significant differences among the three groups of actors were identified. Overall, and inconsistent with first hypothesis, the results indicate that in the scenes that have double messages, the less experience actors had, the more accurately and the more confidently audience could understand the actors' intentions. In the scenes with a single message, there were no differences among the three groups of actors. In short, the findings are not consistent with the first hypothesis.

The second hypothesis was that audience could more easily understand actors' intentions when watching scenes of a single message, and that it would be more difficult to understand actors' intentions in scenes with double messages. The study findings were also inconsistent with this hypothesis. For the novice actors, participants identified Scenes 3 and 4 with more accuracy than in Scenes 1 and 2. Moreover, it was revealed that participants could identify the scene with more confidence in Scenes 3 and 4 than in Scenes 1 and 2.

Why were the results contrary to the study hypotheses? The key to solving this question may be related to the reality of performances. In Scenes 1, 3, and 4, performances by junior expert actors were evaluated as the most realistic whereas the performances of novice actors were evaluated as the least so. The reality of the novice and intermediate actors decreased in their performances in Scenes 3 and 4 in comparison with Scenes 1 and 2, whereas junior expert actors did not display such a tendency. It can be said that the more experience actors have, the more realistically they can perform, especially in scenes that include double messages; that is, the less likely they may be to "over-act." Consistent with this explanation, the results of correlation analyses between evaluation items revealed that the reality of a performance had strong negative correlations with scene identification and confidence in scene identification. Therefore, the findings indicate that the more realistically actors perform, the less accurately and the less confidently the audience can identify which scene actors are performing. It is

plausible that unrealistic performances are exaggerated ones, making it possible for the audience to understand the actors' intentions with ease and confidence.

In the first hypothesis, we proposed that the actors with more experience would be better able to convey their intentions to the audience. Instead, however, we found that the more experience actors have, the more realistically they are able to perform. As a result, junior expert actors could not convey the specific scene they are acting in as well as the novice and intermediate actors, whose performances were less unrealistic and perhaps more exaggerated. The second hypothesis was based on the idea that it would be more difficult for the audience to understand actors' intentions in the scenes with double messages than in those with a single message. However, we found that the reality of performances by novice and intermediate decreased in the scenes with double messages; consequently, the audience could easily understand their intentions in comparison with the scenes with a single message.

Why, then, did the junior expert actors perform in a realistic way at the expense of conveying their intentions to the audience? It is plausible that the junior expert actors could perform both in a realistic way and in an unrealistic and exaggerated way, but they chose the realistic way because they judged this to be more suitable for the scenes. Some junior expert actors actually performed both in a realistic way and in an unrealistic way, then selected realistic performances as the best ones from three performances they have finished. An example of what such an actor (*A*) said to the experimenter (*E*) when choosing the best performance is as follows.

E: Which performance was the best?

A: I think the second performance.

E: The second?

A: Yes. The first performance was funny.

E: Was it funny?

A: It was easily understandable.

This actor talked as above when he chose his best performance for Scene 3. He judged the first performance as easily understandable and funny, and he did not consider this understandable performance as the best one. The same actor made the following comments when choosing his best performance for Scene 4.

E: Which was the best performance?

A: The third performance.

E: The third?

A: Yes. The first and the second performances were, what can I say, well, too

understandable. Yes, they were. They were funny.

E: You laughed at your performances when watching them, didn't you?

A: Because I understood the intentions too easily.

Thus, for both Scenes 3 and 4, this actor specifically did not select the performances for which he understood the intentions easily as the best performance.

In Scenes 3 and 4, each character actor had to act in such a way as to deceive the co-actor, his or her sister. If their performances were unrealistic and exaggerated, the audience could easily understand that the characters were pretending, as would the sister character. Performances that very obviously conveyed to the audience that the characters were pretending would also likely convey to the sister that the actors were pretending; such performances would not be suitable for the situation that the character wanted to deceive the sister. Although it would be very difficult to strike a balance between a message to the audience and a message to the co-actor, junior expert actors might manage to do this. To address this issue, we conducted Study 2.

Study 2

In playing a scene that features double messages, we assume that an actor must not only convey to the audience that the character he or she is acting is pretending, but also conceal from the co-actor that the character is pretending. This is a very complex task, and we therefore predicted that more experienced actors would be more effective than less experienced actors in striking the appropriate balance between these two communications.

Method

Participants. Forty undergraduate and graduate students of a university in Japan participated in Study 2. None of the Study 2 participants had participated in Study 1. Eighteen were male, and twenty-two were female. Their mean age was 20.4 years old.

Material. We used 72 videotaped performances from Study 1, these being the best performances of 36 actors for Scenes 3 and 4. We used only scenes that featured double messages.

Procedure. Unlike Study 1, where participants viewed the performances in a group setting, the Study 2 participants viewed the performances by themselves, because there were differences among the Study 1 participants in the time they needed to evaluate performances. Participants watched the performances on a computer screen, and

evaluated each with respect to four qualities: (1) how successful the character was in deceiving his or her sister; (2) how successful the actor was in conveying to the audience that the character was pretending; (3) how real the actor's performance was; and (4) the overall quality of the actor's performance. They evaluated these four domains on seven-point scales. The order of the performances was counter-balanced.

Results

Success in deceiving the sister character. Participants evaluated how successful the character was in deceiving his or her sister for every performance. The average evaluation scores are presented in Figure 5.

An analysis of variance was used with one between-subjects factor, actors' groups (novice, intermediate, and junior expert), and one within-subjects factor, scenes (Scenes 3 and 4). The main effect of actors' groups was significant, $F(2, 74) = 99.84$, $p < .01$, and Ryan's post-hoc test indicated that intermediate actors were more successful than novice actors, and junior expert actors were more successful than intermediate actors in deceiving the sister ($p < .05$). The main effect of scenes was also significant, $F(1,37) = 5.87$, $p < .05$. The results from Ryan's post-hoc test ($p < .05$) suggested that the actors were more successful in Scene 3 than in Scene 4 in deceiving the sister.

There was a significant interaction between two factors, $F(2,74) = 20.56$, $p < .01$, with further analysis showing that the simple main effects of actors' groups both on Scene 3, $F(2, 148) = 82.30$, $p < .01$, and on Scene 4, $F(2, 148) = 18.47$, $p < .01$, were

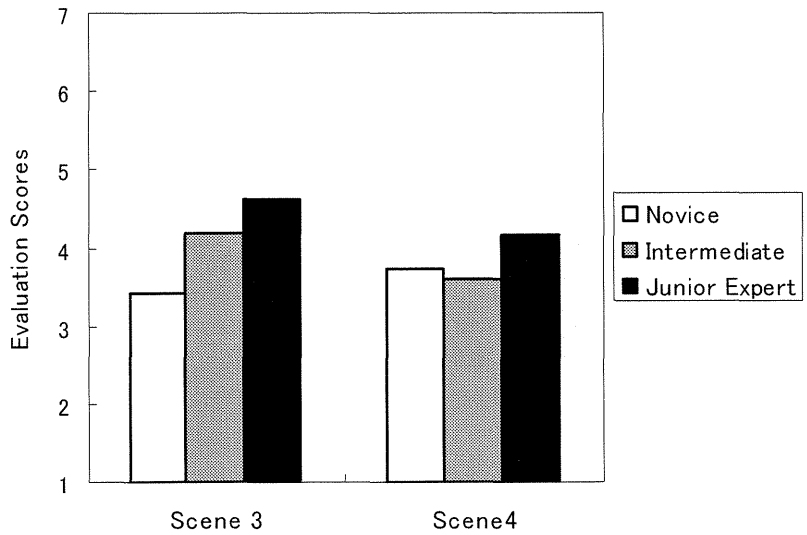


Figure 5. Average evaluation scores participants evaluated how successful the characters were in deceiving their sisters.

significant. Ryan's post-hoc test ($p < .05$) revealed the following significant effects: the evaluation scores in Scene 3, novice actors < intermediate actors < junior expert actors; and in Scene 4, novice actors = intermediate actors < junior expert actors.

Further analysis also showed that simple main effects of scenes on all three actors' groups were statistically significant: the simple main effect on novice actors, $F(1, 111) = 5.94$, $p < .05$, on intermediate actors, $F(1, 111) = 18.68$, $p < .01$, and on junior expert actors, $F(1, 111) = 12.51$, $p < .01$. The results from Ryan's post-hoc test ($p < .05$) revealed the following significant effects: the evaluation scores for novice actors, Scene 3 < Scene 4; and for intermediate and junior expert actors, Scene 4 < Scene 3.

Success in conveying pretence to the audience. Participants evaluated for every performance how successful the actor was in conveying to the audience that the character was pretending. The average evaluation scores are presented in Figure 6.

An analysis of variance was used with one between-subjects factor, actors' groups (novice, intermediate, and junior expert), and one within-subjects factor, scenes (Scenes 3 and 4). The main effect of actors' groups was significant, $F(2, 74) = 39.55$, $p < .01$, and Ryan's post-hoc test indicated that novice and intermediate actors were more successful than junior expert actors in conveying pretence to the audience ($p < .05$). The main effect of scenes was also significant, $F(1,37) = 10.77$, $p < .01$. The results from Ryan's post-hoc test ($p < .05$) indicated that the actors were more successful in Scene 4 than in Scene 3 in conveying pretence to the audience.

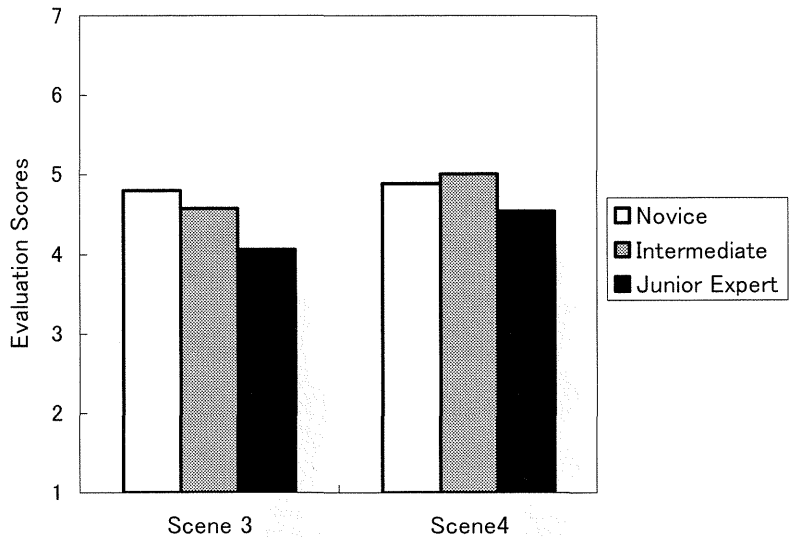


Figure 6. Average evaluation scores participants evaluated how successful the actors were in conveying to the audience that the characters were deceiving their sister.

There was also a significant interaction between two factors, F (2,74) = 4.89, p < .05, with further analysis indicating that the simple main effects of actors' groups both on Scene 3, F (2, 148) = 31.03, p < .01, and on Scene 4, F (2, 148) = 12.72, p < .01, were significant. Ryan's post-hoc test (p < .05) revealed the following significant effect: the evaluation scores in Scene 3, junior expert actors < intermediate actors < novice actors; and in Scene 4, junior expert actors < novice actors = intermediate actors.

Further analysis also showed that the simple main effects of scenes on intermediate and junior expert actors were significant. The simple main effect on intermediate actors was F (1, 111) = 11.35, p < .01, and on junior expert actors, F (1, 111) = 13.87, p < .01. Ryan's post-hoc test (p < .05) revealed that intermediate and junior expert actors were more successful in Scene 4 than in Scene 3 in conveying pretence to the audience.

Reality of performances. The average ratings of reality of actors' performances are presented in Figure 7.

An analysis of variance, with actors' groups (novice, intermediate, and junior expert) as a between-subject factor and scenes (Scenes 3 and 4) as a within-subject factor, yielded the significant main effect of actors' groups, F (2, 74) = 116.65, p < .01. Ryan's post-hoc test indicated that the performances of intermediate actors were more realistic than those of novice actors, and those of junior expert actors were more realistic than those of intermediate actors (p < .05). The main effect of scenes was also significant, F (1,37) = 62.45, p < .01. Ryan's post-hoc test (p < .05) results indicated that the performances of actors were more realistic in Scene 4 than in Scene 3.

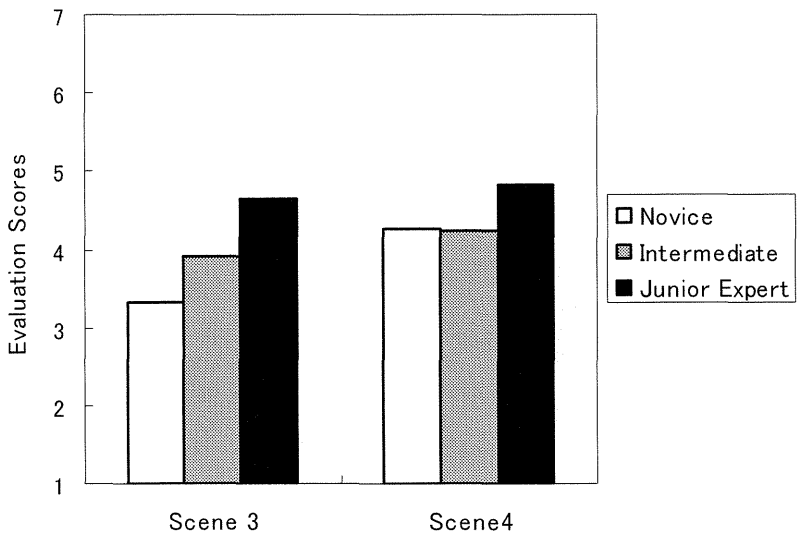


Figure 7. Average evaluation scores participants evaluated how realistic the actors' performances were.

There was also a significant interaction between two factors, F (2,74) = 18.92, p < .01, with further analysis showing that the simple main effects of actors' groups both on Scene 3, F (2, 148) = 105.60, p < .01, and on Scene 4, F (2, 148) = 26.43, p < .01, were significant. Ryan's post-hoc test (p < .05) revealed the following significant effects: the evaluation scores in Scene 3, novice actors < intermediate actors < junior expert actors; and in Scene 4, novice actors = intermediate actors < junior expert actors.

Further analysis also showed that simple main effects of scenes on novice and intermediate actors were significant: the simple main effect on novice actors was F (1, 111) = 93.00, p < .01, and on intermediate actors, F (1, 111) = 11.52, p < .01. Ryan's post-hoc test (p < .05) revealed that performances of both novice and intermediate actors were more realistic in Scene 4 than in Scene 3.

Quality of performances. The averages of the participants' ratings of the quality of the actors' performances are shown in Figure 8.

An analysis of variance with one between-subjects factor, actors' groups (novice, intermediate, and junior expert), and one within-subjects factor, scenes (Scenes 3 and 4) yielded a significant main effect of actors' groups, F (2, 74) = 72.80, p < .01. Ryan's post-hoc test indicated that the performances of intermediate actors were better than those of novice actors, and those of junior expert actors were better than those of intermediate actors (p < .05). The main effect of scenes was also significant, F (1,37) = 19.72, p < .01. The results from Ryan's post-hoc test (p < .05) suggested that the actors performed better in Scene 4 than in Scene 3.

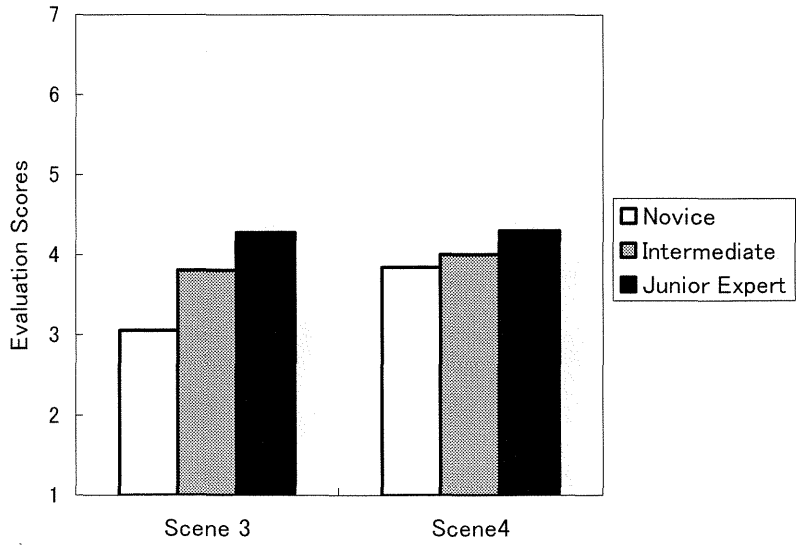


Figure 8. Average evaluation scores participants evaluated how good the actors' performances were.

Table 3. *Correlations between Evaluation Items in Study 2*

	Successfulness in deceiving	Successfulness in conveying	Reality of performance	Quality of performance
Successfulness in deceiving	1			
Successfulness in conveying	−.88**	1		
Reality of performances	.78**	−.67**	1	
Quality of performance	.80**	−.54**	.88**	1

** $p < .01$

There was a significant interaction between two factors, $F(2,74) = 18.92$, $p < .01$, with further analysis showing significant simple main effects for actors' groups on Scene 3, $F(2, 148) = 82.16$, $p < .01$, and on Scene 4, $F(2, 148) = 11.49$, $p < .01$. Ryan's post-hoc test ($p < .05$) revealed the following significant effects: the evaluation scores in Scene 3, novice actors < intermediate actors < junior expert actors; and in Scene 4, novice actors = intermediate actors < junior expert actors.

Further analysis also indicated that the simple main effect of scenes on novice actors was significant, $F(1, 111) = 53.77$, $p < .01$. Ryan's post-hoc test ($p < .05$) revealed that novice actors' performances were better in Scene 4 than in Scene 3.

Correlations between evaluation items. Table 3 shows the correlation coefficients between the following evaluation items: success in deceiving the sister, success in conveying pretence to the audience, reality of performances, and quality of performances.

Whether actors succeeded in conveying to the audience that the character was pretending has a strong negative association with the other three evaluation items. The other three items showed strong positive correlations with each other.

Discussion

The results of correlations between evaluation items revealed that if the audience could easily understand that the character was pretending to deceive his or her sister, the participants also thought that the sister would also easily notice this intended deception. In Scenes 3 and 4, the actors had to play the role of a character who wanted to deceive his or her sister; therefore, performances in which the sister would easily detect this deception were inadequate for these scenes. For that reason, the success in conveying pretence to the audience might have a strong negative correlation with the reality of

performances and goodness of performances. In other words, the more easily the audience can understand that the character is pretending something, the less realistic and the lower the performance is evaluated.

Novice actors might take only the audience into account as a receiver of their message, and might be so conscious of the audience that the audience could easily understand that the characters they were playing were pretending to deceive his or her sister. However, such performances are not suitable for the scenes that contain double messages, and were evaluated as both unrealistic and having less quality. On the other hand, junior expert actors can pay attention to both the audience and the co-actor as receivers of their messages, and can effectively convey to the audience that the character they are playing is trying to deceive his or her sister. That is, they are able to strike a balance between the message to the audience and the message to the co-actor; therefore, their performances were evaluated as more realistic and better than those of the less experienced actors. In the scenes that contained double messages, it is very important to strike a balance between a message to the audience and a message to the co-actor on the stage; something novice actors are less able to manage.

In the results of all four evaluation items, evaluation scores for intermediate actors did not differ from those of novice actors in Scene 4, whereas all three acting groups differed from each other in Scene 3. In terms of quality of performance, intermediate and junior expert actors in Scene 3 were evaluated as good as in Scene 4. On the other hand, novice actors were evaluated more highly in Scene 4 than in Scene 3. It is plausible that novice actors could perform Scene 4 better than Scene 3, as well as intermediate actors performed Scene 4; therefore, novice and intermediate actors did not differ in all evaluation items in Scene 4.

General Discussion

Contrary to the Study 1 hypotheses, novice actors were rated as doing better than junior expert actors in conveying their intentions to the audience in the scenes that had double messages. This might be due to the fact that junior expert actors considered it unsuitable to reveal that the characters they were acting were pretending. In the scenes with double messages, there are two types of receivers of actors' messages: the audience and the co-actor. Therefore, if actors are very obvious in showing that the character is trying to deceive the co-actor, not only the audience, but also the co-actor can notice their deception with ease.

Novice actors were so conscious about the audience that their performances may have been very exaggerated, making it easy for the audience to understand their intentions. However, in this situation, the co-actor would also easily find out what the actors were experiencing. Such exaggerated performances are unsuitable for these scenes with double messages, and evaluated in Study 2 as unrealistic and as being not as good as the performances of the more experienced actors. On the other hand, junior expert actors appeared to strike a balance between a message to the audience and a message to the co-actor, and as a result, the audience was less able to understand their intentions in comparison with the case of novice and intermediate actors, but they could deceive the co-actor better than novice and intermediate actors. Such performances were suitable for the scenes, and were evaluated as both realistic and good.

Some of the junior expert actors performed in an exaggerated way once in three acting sessions, and it is indeed plausible that they can perform both in a realistic way and an exaggerated way. For example, in a slapstick comedy, junior expert actors would perform in an exaggerated and unrealistic way. Thus, more experienced actors are able to adapt their acting manner according to the needs of the individual scene.

In many areas of human performance, 'flexibility' is one of the main characteristics of experts (Feltovich, Spiro, & Coulson, 1997). Expert baseball hitters, for example, can adapt to many different kinds of pitches, thrown from different angles, and at different speeds, whereas novice hitters might not be able to hit curve balls. In addition, some previous studies have revealed that experts consider more information in circumstances in order to decide their action than novices do. McPerson & Thomas (1989) compared novice and expert players in tennis, and found that expert players decided how to hit the ball with considering many things; position of themselves, position of opponents, the level of opponents, and so on. Along these lines, experienced actors might consider more information than less experiences actors, and adapt their acting to the needs of each specific scene. In order to be a successful actor, it is important to take not only the audience but also the situations on stage into account, and change the acting manner according to what is needed in the scene.

Acknowledgements

This research was supported by the Ministry of Education, Science, Sports and Culture, Grant-in-Aid for Exploratory Research obtained by the second author (No. 15650045, 2003-2005). We would like to show our gratitude to Professor Mark P. Jensen, University of Washington, for his helpful comments to the manuscript.

References

Ando, H. (2002). *Engeki no jukutatsuka: Kyakuhon no yomitori kara engi-keikaku, engi-suikou made* [The expertise of an actor: Script reading, performance planning, and actual performance]. *The Japanese Journal of Psychology*, **73**, 373-379.

Ando, H., & Koyasu, M. (2004). *Engeki keiken no umu ni yoru mikaku hyoujou no hyoushutsu narabini engi no sai* [Differences in facial expressions of tastes between actors and laypersons]. *Cognitive Studies*, **11**, 61-74.

Bieri, D, Reeve, R.A., Champion, G.D., Addicoat, L.,& Ziegler, J.B. (1990). The Faces Pain Scale for the self-assessment of the severity of pain experienced by children: development, initial validation, and preliminary investigation for ratio scale properties. *Pain*, **41**, 139-150.

Brockbank, P. (1985) Introduction: Abstracts and brief chronicles. In P. Brockbank (Ed.), *Players of Shakespeare: Essays in Shakespearean performance by twelve players with the Royal Shakespeare Company* (pp. 1-10). Cambridge: Cambridge University Press.

Craig, K. D. (1992). The facial expression of pain: Better than a thousand words? *American Pain Society Journal*, **1**, 153-162.

Ericsson, A. K. (1996). The acquisition of expert performance: An introduction to some of the issues. In K. A. Ericsson (Ed.), *The Road to Excellence: The acquisition of expert performance in the arts and sciences, sports and games* (pp. 1-50). Mahwah, NJ: Lawrence Erlbaum Associates.

Feltovich, P. J., Spiro, R. J., & Coulson, R. L. (1997) Issues of expert flexibility in contexts characterized by complexity and change. In P. J. Feltovich, K. M. Ford, & R. R. Hoffman (Eds.), *Expertise in Context: Human and machine* (pp. 125-146). Menlo Park, CA: The MIT Press.

Jacox, A. K. (1980) The assessment of pain. In W. L. Smith, H. Merskey, & S. C. Gross (Eds.), *Pain: Meaning and management* (pp.75-88). New York: SP Medical & Scientific Books.

McPherson, S. L., & Thomas, J. L. (1989) Relation of knowledge and performance in boys' tennis: Age and expertise. *Journal of Experimental Child Psychology*, **13**, 307-325.

Melzack, R. (1975). The McGill Pain Questionnaire: major properties and sourcing methods. *Pain,* **1**, 277-299

Noice, T., & Noice, H. (1997). *The Nature of Expertise in Professional Acting: A cognitive view*. Mahwah, NJ: Lawrence Erlbaum Associates.

Poole, G. D., & Craig, K. D. (1992). Judgments of genuine, expressed, and faked facial expressions of pain. *Journal of Personality and Social Psychology*, **63**, 797-805.

平成 15 年度～17 年度科学研究費補助金（萌芽研究）研究成果報告書

痛みの認知・表現・推測に関する認知科学的アプローチ

課題番号：15650045

研究代表：子安増生（京都大学大学院教育学研究科・教授）

刊行年月：平成 18 年 3 月

印刷会社：中西印刷株式会社

連 絡 先：〒606-8501　京都市左京区吉田本町

京都大学大学院教育学研究科

電話・ファックス　075-753-3063

電子メイル　HGB03675@nifty.com